

(NASA-TM-X-72910) PATTERNS OF AVAILABILITY
AND USE OF AUDIOTAPE CASSETTES IN SPECIAL
LIBRARIES Ph.D. Thesis (Florida State
Univ.) 157 p HC \$6.75 CSCL 05B

N76-14966

Unclas
G3/82 06931

THE FLORIDA STATE UNIVERSITY
SCHOOL OF LIBRARY SCIENCE

PATTERNS OF AVAILABILITY AND
USE OF AUDIOTAPE CASSETTES IN
SPECIAL LIBRARIES

By
J. MARSHAL HUGHES II

A Dissertation submitted to the
School of Library Science
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

PRICES SUBJECT TO CHANGE

Approved:

Copyright © 1975
by J. Marshal Hughes II
All rights reserved

John M. Gordon
Major Professor

Reed H. Rockwood
Committee Member

Teresa Emmett Rockwood
Committee Member

Harold S. Clark
Committee Member

Harold S. Clark
Dean, School of Library Science

December, 1975

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

N O T I C E

THIS DOCUMENT HAS BEEN REPRODUCED FROM THE
BEST COPY FURNISHED US BY THE SPONSORING
AGENCY. ALTHOUGH IT IS RECOGNIZED THAT CER-
TAIN PORTIONS ARE ILLEGIBLE, IT IS BEING RE-
LEASED IN THE INTEREST OF MAKING AVAILABLE
AS MUCH INFORMATION AS POSSIBLE.

h-a

PATTERNS OF AVAILABILITY AND
USE OF AUDIOTAPE CASSETTES IN
SPECIAL LIBRARIES

(Publication No.)

J. Marshal Hughes II, Ph.D.
The Florida State University, 1975

Major Professor: John M. Goudeau

The focus of this research was in two parts: (1) an investigation to determine the availability of audiotape cassettes in special libraries and to what extent the patrons are informed about this medium, and (2) an investigation to ascertain how audiotape cassettes are used by special libraries and an evaluation by patrons of this use.

The descriptive method, i.e., the use of a questionnaire to survey the population, was selected for both segments of the research. The first questionnaire was sent to a purposive sample of 480 libraries with the second questionnaire being sent to: (1) a large aeronautics research center library, (2) a medical library, and (3) a university library with a special collection of audiotape cassettes.

When the results from the Availability Questionnaire were compiled and analyzed, certain finds and conclusions emerged. The study identified how special libraries utilize audiotape cassettes, who the users of this medium are, how the libraries acquire and maintain their collection, and

i b

opinions of special librarians as to the value of the audio-tape cassette as a medium for disseminating information.

The preponderance of the material was in the three subject areas of: (1) medicine, (2) management, and (3) law. Vocational and self-study audiotape cassettes were next in popularity.

The number of titles in the collections was relatively small.

The heaviest users of spoken-voice audiotape cassettes are students with the emphasis on law students and medical students.

Special libraries make the medium available to the patrons by various methods.

The majority of the libraries circulated their audio-tape cassettes.

Most of the libraries catalog their audiotape cassettes using the Library of Congress Classification System, Dewey Decimal Classification System, or an in-house classification system. Accompanying material is usually cataloged with the audiotape cassette utilizing the same system.

The questionnaire concerning the manner in which the patron used the medium brought forth the following information:

Most of the respondents preferred to listen to audio-tape cassettes individually.

l-c

The time period for listening to audiotape cassettes most patrons preferred was in the evening.

Both male and female respondents were more likely to have listened to the audiotape cassettes only once.

The length of time that most respondents listened to audiotape cassettes was from twenty to thirty-nine minutes.

When queried in open-ended questioned about the favorable and unfavorable aspects of the format additional information was supplied. Positive comments related to the ease of use, convenience, format, voice inflections, time savings, and use for supplementing other materials. The ability to use audiotape cassettes while doing other tasks was also lauded.

Negative aspects of audiotape cassettes most often cited were the lack of supplementary material for use with the audiotape cassettes, quality of the material presented, and quality of the format and equipment.

i-d

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	1
LIST OF TABLES	ii
CHAPTER	
I. INTRODUCTION	1
A. Statement of the Problem	2
B. Significance of the Problem	4
II. REVIEW OF RELATED RESEARCH MATERIAL	16
III. METHODOLOGY AND FINDINGS OF THE RESEARCH	44
A. Assumptions	46
B. Limitations	47
C. Definitions of Terms	47
D. Findings of the Research Related to the Availability Questionnaire	47
E. Findings of the Research Related to the User Questionnaire	79
IV. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH	116
A. Summary and Conclusions Related to the Availability Questionnaire	117
B. Summary and Conclusions Related to the User Questionnaire	123
C. Recommendations for Further Research	125

h-e

BIBLIOGRAPHY	128
APPENDICES	
A. Availability Questionnaire	135
B. User Questionnaire	141
C. Chi-Square Data	144

ii-f

i-g

ACKNOWLEDGEMENTS

I wish to express my sincere appreciation to Dr. John M. Goudeau, as major advisor, Dr. Harold Goldstein, Dr. Ruth H. Rockwood, and Dr. Persis E. Rockwood for their encouragement, support and guidance during this research.

I wish to thank the NASA Langley Research Center management for the financial and administrative support, and particularly the staff of the LRC Technical Library for their support and patience.

I wish to thank my parents who always emphasized the value of education.

Finally, I wish to thank my wife, Sue, who typed for, suffered with, and supported me with love and understanding.

LIST OF TABLES

TABLE

1. Respondents to the Availability Questionnaire by Subject Category	49
2. Respondents Who Have Audiotape Cassettes in Their Audiotape Collections	50
3. Respondents Who Intend to Include Audiotape Cassettes in Their Audiotape Collections	50
4. Subject Areas Provided by the Researcher in the Audiotape Cassette Collections	52
5. Subject Areas Added by the Respondents as Being Included in the Audiotape Cassette Collections ("Other Category").	53
6. Subject Areas Included in the Audiotape Cassette Collections	54
7. Ranked Order of Subject Areas Contained in the Audiotape Collections	56
8. Number of Separate Titles in the Audiotape Cassette Collections	59
9. Collection Sizes of Audiotape Cassettes	59
10. Intended Level of Audiotape Cassette Collection	60
11. Major Users of the Audiotape Cassette Collections By Rank	62
12. Audiotape Cassette Collections Available Only For In-Library Use	63
13. Collections That Circulate Audiotape Cassettes	64
14. Time Periods for Collections That Circulate Audiotape Cassettes	67

15.	Collections Which Duplicate Tapes for Circulation .	68
16.	Special Libraries That Lend Playback Machines with the Audiotape Cassette Collections.	68
17.	Special Libraries with the Facilities for the Repair of Playback Equipment	69
18.	Special Libraries with the Facilities for the Repair of Audiotape Cassettes	70
19.	Sources Used to Acquire Audiotape Cassettes	71
20.	Libraries Which Publicize Their Audiotape Collections	72
21.	Ranked Percentages of Methods Used to Publicize Audiotape Cassette Collection	72
22.	Special Libraries Providing Purchase Information to their Patrons	73
23.	Interlibrary Loan of Audiotape Cassettes	73
24.	Audiotape Cassettes Which Are Cataloged	75
25.	Systems Used to Catalog the Audiotape Cassettes by Rank	75
26.	Special Libraries Cataloging the Accompanying Material	76
27.	Systems Utilized to Catalog Material Accompanying Audiotape Cassettes	76
28.	Locations Utilized for Storage of Audiotape Cassettes	77
29.	Method of Storage of Material Accompanying Audiotape Cassettes	78
30.	Respondents to User Questionnaire by Gender	81
31.	Respondents to User Questionnaire by Age and Category	83

32.	Respondents to User Questionnaire by Listening Preference	85
33.	Respondents to User Questionnaire by Listening Preference and Gender	86
34.	Respondents to User Questionnaire by Listening Preference and Vocation	87
35.	Respondents to the User Questionnaire: Listening Location for Males	88
36.	Respondents to the User Questionnaire: Listening Location for Females	89
37.	Respondents to the User Questionnaire: Listening Location by Vocation	90
38.	Respondents to User Questionnaire: Listening Locations	91
39.	Respondents to the User Questionnaire: Period of Listening by Gender	91
40.	Respondents to User Questionnaire: Period of Listening	92
41.	Respondents to User Questionnaire: Period of Listening by Vocation	93
42.	Respondents to User Questionnaire: Average Times Listened To by Respondents	94
43.	Respondents to User Questionnaire: Average Times Listened To by Males	95
44.	Respondents to User Questionnaire: Average Times Listened To by Females	96
45.	Respondents to User Questionnaire: Average Times Listened To by Vocation	97
46.	Respondents to User Questionnaire: Preferred Length of Audiotape Cassette Presentation (In Minutes)	98

47.	Respondents to User Questionnaire: Preferred Length of Audiotape Cassette Presentation In Minutes for Males	99
48.	Respondents to User Questionnaire: Preferred Length of Audiotape Cassette Presentation In Minutes for Females	100
49.	Respondents to User Questionnaire: Preferred Length of Audiotape Cassette Presentation By Vocation (Part A)	101
49.	Respondents to User Questionnaire: Preferred Length of Audiotape Cassette Presentation By Vocation (Part B)	102
50.	Respondents to User Questionnaire: Value of Supplementary Material by Age Group	103
51.	Respondents to User Questionnaire: Value of Supplementary Material by Gender	104
52.	Respondents to User Questionnaire: Value of Supplementary Material by Vocation	105
53.	Respondents to User Questionnaire: Format Preference by Gender	106
54.	Respondents to User Questionnaire: Format Preference by Age	106
55.	Respondents to User Questionnaire: Format Preference by Vocation	107
56.	Respondents to User Questionnaire: Educational Levels	108
57.	Respondents to User Questionnaire: Educational Levels of Males	109
58.	Respondents to User Questionnaire: Educational Levels of Females	110

PATTERNS OF AVAILABILITY AND USE OF
AUDIOTAPE CASSETTES IN SPECIAL LIBRARIES

INTRODUCTION

A relatively new medium being utilized by special libraries is the audiotape cassette. Referred to by various nomenclatures--cassette tapes, audio-cassettes, enclosed reel cartridges--this medium has had a tremendous growth rate since its introduction into the United States by the Philips Company of Holland in 1965.¹ Many colloquia, symposia, and conferences distribute their proceedings on cassette tapes rather than publish the material in a printed format and much of the current awareness material for the profession is disseminated in this manner. This contemporary format is used to present programs for self-help and continuing education as well as lectures by noted educators. New and varied contents are proffered by innovative publishers trying to capture an evolving audio literary market.

The new medium is being forced into library collections since most of the information presented on cassette tapes is only available in that format. Printed material which accompanies these cassettes is usually supplementary in

¹"Magnetic Tape: Evolution or Revolution," International Tape Association News Digest, July-August, 1973, p. 8.

nature. That which is produced in multiple formats is oriented toward the public library and libraries for the blind. Examples are the condensed books on tape published by Voice Over Books and direct readings of monographs for the Talking Books for the Blind Series. If these two categories are excluded the contents of the cassettes purchased by special libraries are usually available only in this form. Therefore, the special librarian must accept the fait accompli that cassettes are becoming a library medium for storing and disseminating information.

STATEMENT OF THE PROBLEM

The problem proposed for investigation was the determination of availability and use of audiotape cassettes in the special library.

Choice is a determining factor in user acceptance of a product. If two or more alternatives exist, a selection can be made which results in a level of either satisfaction or dissatisfaction. The use of audiotape cassettes in the library does not present this option to the patron. The library and, in turn, the patron are offered the material only in that format on a take-it-or-leave-it basis. Unlike microfilm and microfiche which can be converted to hard-copy and vice versa, cassettes have no easily produced

alternative. Special libraries often have the capability to reproduce micromedia in-house but cannot realistically convert cassettes from sound to print. Therefore, cassettes must be accepted or rejected without an alternative and with levels of satisfaction or dissatisfaction determined only after acceptance. Rejection prevents evaluation of the format or the content. Conversely, rejection may follow initial acceptance; for example, the patron who listens to the audiotape cassette and then rejects future usage of the medium.

Research to determine whether a product within the library is accepted or rejected is important to the library profession but is insufficient in itself. It is as important to determine conditions of acceptance and rejection as it is to determine the fact per se.

Specifically the research objectives for the study are:

- (1) To determine the availability of audiotape cassettes in special libraries and to what extent the patrons are informed about this medium;
- (2) To ascertain how audiotape cassettes are used by special libraries.

More precisely:

- (a) To determine who the users of audiotape cassettes are and if the tapes were listened to by a group or by an individual;
- (b) To determine if there is a relationship between

- age, background, and vocation of the user and acceptance or rejection of audiotape cassettes;
- (c) To determine where, how often, and when users listen to audiotape cassettes;
 - (d) To determine if supplementary printed material is provided with the audiotape cassettes and user reaction to this material when provided;
 - (e) To determine if the presentation of the content materials would be better received in another format, and if so, what format.

SIGNIFICANCE OF THE PROBLEM

Since its inception in 1961 and introduction into the United States in 1965,² the cassette tape has had two phases of development. The first was in the production of youth-oriented music. The compact recorders and the easily used cassettes were readily accepted by younger people³ and the popularity is expected to exceed that of disk recordings.⁴ Public and school libraries are beginning to select audiotape cassettes rather than phonodisks. The reasons cited

²Ibid., p. 8.

³Ursula Vils, "Turning On to the Cassette Revolution," Los Angeles Times, October 13, 1972, p. 24.

⁴Noel Ryan, "Will You Have Cassette Tapes in Your Library?" Canadian Library Journal, XXVIII (March, 1971), 109.

are that: (1) many young adults (and older ones, too) have portable cassette players; and (2) the audiotape cassette is more common in education circles.⁵ Vils reports that jazz and popular music are most in demand, but that spoken-voice cassettes of documentaries, discussions, and speeches are also popular, especially with teenagers, who are more likely to have the cassette playback machines.⁶ Spoken-voice audiotape cassettes are available for children as well. Carr notes areas of interest varying from Hans Conreid reading stories by Dr. Seuss (Theodore Seuss Gissell) to Boris Karloff narrating Graham's The Reluctant Dragon.⁷ Noble credits the rising interest in information cassettes to two causal factors. The first factor is the heavy national advertising campaigns which have caused cassette equipment and cassette tapes to be accepted as consumer entertainment in the popular and classical markets. Second, numerous companies are using cassettes as an on-the-road information source for their salesmen.⁸

⁵Ramon R. Hernandez, "Youth Choices and Simple Processes; the Young Adult Compact Media Project at Merrill," Wisconsin Library Bulletin, LXVIII (January-February, 1972), 32-36.

⁶Vils, p. 24.

⁷Mary Carr, "Cassettes Pertaining to Children's Literature," Wisconsin Library Bulletin, LXIX (November-December, 1973), 397-398.

⁸Valerie Noble, "Chatty Chatty Bang Bang: Business Information Cassettes," Special Libraries, LXIII (May, 1971), 231.

With the increased use of audiotape cassettes in the music field came an increased utilization of the medium for spoken-voice presentations. The rapid growth is illustrated by an in-depth market study by Knowledge Industry Publications, which estimates sales of "published information and education tapes and records" at sixty-seven million dollars for 1972 with an additional ten million dollars spent on spoken-word programs for use within corporations.⁹ Another market estimate by the International Tape Association reveals an increased percentage of spoken-word cassettes in the audiotape market.¹⁰

A wealth of general material on current subjects, topics for continuing education, and areas of consumer interest are available on audiotape cassettes. Current subjects such as selected speeches made before the Congress of the United States and United Nations speeches by Heads of State are available from the Mass Communication, Inc.¹¹ The University

⁹Paul Doeblner, "Audio Tapes Seek a Place in Bookstores, Libraries," Publisher's Weekly, CCIII (February 19, 1973), 65.

¹⁰Ibid., p. 65.

¹¹Mass Communications, Inc. of Westport, Connecticut, no pagination, (brochure).

of California Extension Media Center produces audiotope cassettes in many subject areas.¹² Consumerism audiotope cassettes are also marketed.¹³

Many types of information are presented on audiotope cassettes. Lawyers are informed by the Law Library Journal about cassettes available for continuing education.¹⁴

Members of the legal profession are recognizing the cassette as a new and effective means for instruction. The cassettes provide new developments in the law, in convenient, timely, and economic form, to interested lawyers wherever and whenever they wish to listen and study.¹⁵

Tips were also given on how to promote effective recording¹⁶ and where to locate procurement information.¹⁷

Medical doctors have several sources of information for current awareness and dissemination of new technique in their individual specialties. The Audio Digest Foundation offers nine subscription services to doctors with each service

¹²University of California Extension Media Center, XLIV (February 10, 1975), no pagination, (brochure).

¹³Ad-Tapes, Inc. of Palos Verdes Estates, California, no pagination, (brochure).

¹⁴"Cassettes on Legal Subjects for Continuing Legal Education," Law Library Journal, LXIII (August, 1970), 315.

¹⁵Ibid., p. 315.

¹⁶Ibid., p. 315-316.

¹⁷"Cassettes on Legal Subjects for Continuing Legal Education," Law Library Journal, LXV (February, 1972), 72.

covering a particular specialty by recording seminars, conferences, and university courses. The tapes are mailed to the subscribers monthly or semi-monthly.¹⁸ The doctors are able to listen to discussions which they may have missed or intend to interview. This and other sources of refresher courses and audiotapes are listed in the Journal of the American Medical Association.¹⁹ Many journals for the health profession may be subscribed to by special libraries. Twenty-five are listed by Port as being available.²⁰

The medical professional as well as the layman can avail himself of behavior modification audiotape, cassettes. The Human Behavior Institute has a curriculum of several programs, subdivided into sessions, which endeavor to modify behavior at all stages of life.²¹ "Personal success and happiness" are a goal of the Learning Dynamics package of materials which includes audiotape cassettes.²² Another producer of

¹⁸Doebler, Ibid., p. 65.

¹⁹"Taped Audio Programs," Journal of the American Medical Association, CCXXV (August 13, 1973), 892-894.

²⁰Jane Port, "Audiocassette Journals for the Health Professions," Special Libraries, LXIV (November, 1973), 490-491.

²¹Human Behavior Institute, Inc., of Atlanta, Georgia, no pagination, (brochure)

²²Learning Dynamics, Inc. of Boston, Massachusetts, no pagination, (brochure)

audiotape cassettes assures the listener that he will attain positive behavior modification enabling one to "manage yourself" more effectively.²³

Audiotape cassettes are used by companies to enable their salesmen to receive information on new product announcements, sales training, quarterly performance reports, and special messages such as a replay of the highlights of the annual sales meeting. These tapes are designed to be listened to while the salesman is on the road.²⁴ Industry use of cassette tapes as a learning tool is expanding with special emphasis placed on the need to disseminate business information through the spoken word.²⁵ Executives are taught how to dictate correspondence and reports by listening to an audiotape cassette course entitled "Writing Out Loud."²⁶ An overview for accounting for managers is also available.²⁷

²³Nation's Business Sound Seminar Division of the Chamber of Commerce of the United States, Washington, D. C., no pagination, (brochure).

²⁴"Leisurely Learning Via Cassettes," The Marketing Magazine, CVI (February 1, 1971), 21.

²⁵"Industry Educational Uses of Cassettes on Upswing," Merchandizing Week, CIII (November 22, 1971), 12.

²⁶"What's New," Today's Secretary, LXXVII (November, 1974), 2.

²⁷Schrello Associates, Long Beach, California, no pagination, (brochure).

The American Management Association Extension Institute has additional programs for managers.²⁸ A rapidly growing use of audiotape cassettes involves sales training and sales information.²⁹ Messages to stockholders from the president of the corporation are also delivered by this medium.³⁰ To make communication more effective one organization produces a monthly audiotape cassette news service covering internal research and development consisting of two parts: (1) the highlights of research and development achievement for the month and (2) an in-depth feature story.³¹ After a period of time certain changes and improvements were made as well as the initiation of an external chemical news series.³²

²⁸American Management Association Extension Institute of New York, New York, no pagination, (brochure).

²⁹"Cassettes Growing as Tool for Salesmen, Sales Training," Merchandizing Week, CIII (November 22, 1971), 70.

³⁰"How Business Uses Cassette Tape Duplicating," Office, March, 1972, p. 168-169.

³¹W. E. Hanford, E. L. DeShong, M. Chernoff, and R. W. Maizell, "The Industrial Chemist and Chemical Information: The Human Ear as a Medium," Journal of Chemical Documentation, XI (no. 2, 1971), 68.

³²W. E. Hanford, R. E. Maizell, and M. Cherniff, "Chemical News Via Audio Tapes: Chemical Industry News," Journal of Chemical Documentation, XII (no. 1, 1972), 3.

Another application of the audiotape cassette for training of employees is utilized by the United States Army. Referred to as TEC (Training Extension Course) the package includes visual material and audiotape cassettes that enable the soldier to learn on-the-job skills. Monitoring of the education is accomplished by testing after completion of the package.³³

The field of education has found the cassette tape to be an especially useful medium. Lectures recorded on audiotape cassettes have proven to be an effective method for teaching many subjects.

Flexibility in teaching is accomplished by removing the lectures from the limitations of time and space in the classroom thus allowing the professor to more easily tailor the course to the individual student.³⁴ Students are using the cassette to record lectures which they can replay to learn the subject matter by repetition or to augment notes taken in class.³⁵ Listening to cassettes is the easiest and

³³Gene A. Lohmaier, "Training by Cassette," Soldiers, XXX (March, 1975), 26-27.

³⁴Jim Atkins, "Students Learn From Recorded Lectures," Ideas in Sound, April, 1973, p. 5.

³⁵Sonny Pagotta, "How Cassette Are Used As an Information Source," Ideas in Sound, April, 1973, p. 3.

usually most effective way to learn according to Eugene Schwartz of Information, Inc.³⁶ Tauber states that the audiotape method of instruction has been as successful in meeting instructional objectives of the teacher as had been the traditional method of teaching.³⁷ Additionally, Tauber believes that evidence exists for utilizing the cassette tape to provide feedback to a student by a teacher about the student's progress toward meeting instructional objectives.³⁸

Audiotape cassettes are being produced specifically for the field of education. The subjects listed by one company in its Cassette Curriculum catalog include British Literature, World Literature, The Twentieth Century American Novel, Nineteenth Century American Novels, and Modern Drama Series, as well as readings in the areas of semantics, Shakespeare, poetry, history, and writing.³⁹ The American Educational Research Association (AERA) provides two series of audiotape cassettes for the educator to purchase to maintain awareness

³⁶Ibid., p. 3.

³⁷Robert Thomas Tauber, "The Cassette Tape Recorder Means Versus Written and Symbolic Means of Providing Feedback of a Student's Performance on Secondary School Science Laboratory Exercises." (unpublished Ph.D. dissertation, Pennsylvania State University, 1971), p. 24.

³⁸Ibid., p. 26.

³⁹Everett/Edwards, Inc. Company of Deland, Florida, no pagination, (brochure).

of developments in educational research. The first series is the AERA Annual Meeting Speakers and the second is the AERA Training Tapes which are designed to provide up-to-date information on recent advances in the educators area of specialization.⁴⁰

Audiotape cassettes are included in special library collections as another form of media for presenting information in specific subject areas. The medium, itself, is used by libraries for orientation and instruction in the use of library tools.

The librarian's role in developing self-instruction presentations is explored by Palmer. She combines slides and audiotape cassettes to provide a multimedia approach to library instruction. The primary values of the approach are presented as:

- "1. It permits the use of a great variety of content matter.
2. It meets the multi-media expectations of this student generation.
3. It increases the teaching potential of a limited library instruction staff.
4. It permits greater scheduling flexibility for the classroom faculty.

⁴⁰ American Education Research Association, no pagination, (brochure),

5. Its presentation by the classroom faculty has the advantage of increasing the student's feeling of responsibility for its content and use."⁴¹

The J. Hillis Miller Health Center Library has available for its patrons a taped tour of the facility with a second orientation device consisting of a short instruction tape on the use of Index Medicus.⁴² Other libraries have similar use instructional programs.⁴³ Tours are also conducted through cities,⁴⁴ recreational areas, and states.⁴⁵

Increasingly many organizations and societies publish their proceedings and speeches on specific subjects on audiotape cassettes. The Institute of Electrical and Electronics Engineers, Inc. (IEEE) distributes material by

⁴¹Millicent C. Palmer, "Creating Slide-Tape Library Instruction: the Librarian's Role," Drexel Library Quarterly, VII (July, 1972), 251-267.

⁴²Elizabeth S. Eaton, "Library Orientation Methods: J. Hillis Miller Health Center Library Program," Bulletin of the Medical Library Association, LX (January, 1972), 133.

⁴³Marvin E. Wiggins, "The Development of Library Use Instructional Programs," College and Research Libraries (November, 1972), 474.

⁴⁴Tour Development, Centennial Tours Company of Orlando Florida, no pagination, (brochure).

⁴⁵"Travel America Series," of Booktape Productions of Greenwich, Connecticut, no pagination, (brochure).

noted authorities by this medium in their "Soundings" series.⁴⁶ The American Society for Information Scientists (ASIS) now records its annual meetings on audiotape cassettes. This practice began with the 1973 Annual Meeting.⁴⁷ Other organizations that now distribute their proceedings or publications on audiotape cassettes include the American Association for the Advancement of Science, the American Society for Testing and Materials, the American Institute of Aeronautics and Astronautics, and the American Mathematical Society. Additionally, the Air Pollution Control Association, the American Chemical Society and the American Society for Metals present some of their publications and lectures using this format..

A relatively new use of the media is a chapter-by-chapter narrative by the author about his textbook or handbook. An example is Grounding and Shielding Techniques in Instrumentation by Ralph Morrison. The author details his methods verbally as well as by printed word. Topics in each chapter which require special attention are indicated. Comments are given to enable the reader to get maximum value from the text and schematics for solving noise problems.⁴⁸

⁴⁶Institute of Electrical and Electronics Engineers, Inc. no pagination, (brochure).

⁴⁷"The Audio Cassette: A Unique Approach to the 1973 ASIS Annual Meeting," ASIS Newsletter (August, 1973), 3.

⁴⁸John Wiley & Sons, Inc. of New York, no pagination, (brochure).

II. REVIEW OF RELATED RESEARCH

Little empirical evidence exists concerning the acceptance or rejection and evaluation of the spoken-voice audiotape cassette in the library environment. Neal experimented with audiotape cassettes to determine the factors associated with the perceived value of the cassette and consequences of the use of the audio cassettes for keeping elementary and secondary school principals informed about innovations in education. A second aspect of the problem was an attempt to provide much better bases than now available for determining whether or not efforts to inform principals through the use of audiotape cassettes should be undertaken. The study was confined to school districts, school study councils, state principals' associations, and universities associated with the University Council for Educational Administration. The fifteen minute audiotape cassettes that the participants evaluated were developed and prepared by the ERIC Clearinghouse on Educational Management at the University of Oregon in conjunction with the University Council for Educational Administration.⁴⁹ To achieve the purpose, three

⁴⁹Jack Delano Neal, "Factors Associated With the Use of Audio Cassettes in Keeping School Principals Informed About New Ideas and/or Innovations in Education." (Unpublished Ph. D. dissertation, University of Pittsburgh, 1972), p. 77.

questionnaires were developed and administered to the participants in the projects: (1) a demographic questionnaire; (2) an individual topic evaluation; and (3) a comprehensive questionnaire.⁵⁰ Five factors were identified which influenced the participants' perceived value as well as the consequences they viewed to be a result of the utilization of the Audio Cassette Program. The conclusions were that: (1) women were more positive about the program and shared topic information with more colleagues; (2) principals in the thirty-one to forty age group were more inclined to accept unusual practices and concepts; (3) broad concepts and theory were accepted by the principals with the most formal education; (4) the more experience a principal had, the less inclined he was to influence change; and (5) principals who had experience in more than one system appeared more responsive to change. Also identified were factors which had little or no influence on the principals' perceptions of the Audio Cassette Program. These are: (1) the program was perceived similarly by rural, suburban, and urban principals; (2) the age and number of students administered by the principals had little influence; (3) previous audio cassette listening habits and reading habits tended not to influence the perceptions of the

⁵⁰Ibid., p. 7-8. . . .

principals as to the value of the cassettes; and (4) whether the tapes were listened to in a group or individually had little influence on the participants. The principals also felt before and after the program, that aids should accompany the cassettes in the form of a bibliography, abstract, or discussion questions. Before participating in the program, more than ninety percent of the participants felt that the audiotape cassette could be a useful means of in-service education. After completing the project, the participants were still overwhelmingly in favor of continuing this method as an in-service practice for principals.⁵¹ Some participants indicated that they would like to read as well as listen to the topics, but the principals were consistent in that they preferred to listen to rather than read the particular subject matter presented. Numerous comments appended to the questionnaires led the writer to conclude that some principals feel a conflict of loyalties when they state that they would rather listen than read.⁵²

The fourteen topics used in the Audio Cassette Program were evaluated by the participants with a wide divergence of opinions which appeared to be due to the varied background and training of respondents. Each topic was evaluated as

⁵¹Ibid., p. 81-82.

⁵²Ibid., p. 82-83.

being the most outstanding as well as the poorest at least five times. The three topics considered to be the best had similar characteristics as those topics that were judged to be relevant to the principal's work, useful to others in the school system, and prone to stimulate discussion with other staff members. The favored topics tended to give specific data, details, procedures, and cause-effect information.⁵³

Commonality of the three poorly rated topics was due at least in part to the subject matter: the problems, concerns, and difficulties of the underprivileged with allusions to alternatives which should be offered to this segment of society.⁵⁴

Complaints concerning the program were centered around the technical quality of the tapes. Many participants were compelled to add comments indicating that background noise, echoes, and distortion made listening to particular topics quite difficult. Neal states that this factor did not influence the participants' objectivity when it came to the evaluation of topic content. He notes that the topic which was rated as having the poorest technical quality was considered to be one of the three most outstanding presentations.⁵⁵

⁵³Ibid., p. 83.

⁵⁴Ibid.

⁵⁵Ibid., p. 83-84.

Nearly fifty percent of the participants in the Audio Cassette Program indicated that they had pursued additional reading on particular topics as a result of listening to the cassettes. The assumption was not made by Neal that the audiotape cassettes were a major factor in stimulating principals to do additional reading on educational issues.⁵⁶

The tapes for the Audio Cassette Program consisted of topics that required a maximum of fifteen minutes of the participants' time. Forty-six percent of the participants indicated that this was the preferred time limit. Fifty-three percent indicated preference for a thirty-minute presentation for the topics and that time constraints should be flexible to allow the content and format of future programs to be varied. The principals preferred the question-and-answer format, but indicated that variety of formats would maintain high interest in the series.⁵⁷

Major criticism of the Audio Cassette Program, with the exception of the inability to interact with the person on the tape, suggested a need for diversity of views on single topics, fewer broad generalizations, less time wasted on irrelevant information, and higher technical quality control.

⁵⁶Ibid., p. 84.

⁵⁷Ibid., p. 84-85.

The major benefits as perceived by the principals were that the participants could keep abreast of the ever changing nature of education and ideas relating to instruction in the school system. Over ninety percent felt that the program should be continued.⁵⁸

Shami proposed the use of reel-to-reel tape recordings as a technique for disseminating information to educators. Two school districts were sampled with one district serving as an experimental group and the other as the control group. The method used to impart the information was Dissemination On Tape (DOT). Aside from the primary proposal to use tape recordings as a technique for disseminating information, the study was designed to accomplish the following objectives:

1. To introduce the DOT information system to educators;
2. To determine the attitudes of educators towards the adoption of DOT information system;
3. To solicit subject areas in which educators would like tapes when the DOT system becomes operational;
4. To survey facilities available for introducing DOT information system.

In the pursuit of those objectives the following hypotheses were tested: _____

⁵⁸ Ibid., p. 85-86.

1. Attitudes of the educators in the State of Idaho are in favor of the DOT information system, regarding dissemination of information, as compared to reading.
2. By experiencing the DOT information system, that is listening to tapes, educators become more favorable towards this system of disseminating information than they have been before listening to the tapes.
3. Teachers and administrators in the State of Idaho have similar attitudes towards the DOT information system.
4. Schools in the State of Idaho have the necessary facilities for implementing the DOT information system.
5. There is no significant variation in the areas of interest specified by the teachers for content of the tape recordings, as compared to the group of administrators.⁵⁹

Two different questionnaires were administered. The first secured data that served as a basis for contents of tapes to be used in the study and which would be proposed

⁵⁹Wijdan Ali Shami, "An Innovation in Education: Dissemination on Tape (DOT)" (unpublished Ph. D. dissertation, University of Idaho, 1970), p. 68-70.

for future tape recording programs. The second questionnaire was designed to obtain data that conveys educator's attitudes toward Dissemination on Tape (DOT) information systems. The investigation reached the following conclusions:

- (1) The three subject areas most liked by the educators were:
 - a. motivation, retention, and transfer;
 - b. programmed instruction; and
 - c. cognitive abilities and processes.
- (2) The most preferred forms of presenting the contents are: Summaries of books, reviews of research, and summaries of articles;
- (3) Preferred length of tapes is fifteen to thirty minutes;
- (4) Tape recorders are available in schools, but not in sufficient quantities;
- (5) A positive attitude was expressed toward DOT systems, but reservation was expressed to the practicability of the methods used to disseminate the material (reel-to-reel tapes);
- (6) Many educators failed to appreciate the system which they felt was intended to replace, not augment books;
- (7) Non-users were unaware of the service causing the

investigator to recommend easy accessibility and availability in the library with in-depth cataloging.⁶⁰

Significance for this investigator's research were several specific conclusions reached by Shami in her investigation. The results revealed that there is no significant difference between the interests of teachers in listening to tape recordings as compared to reading a book. Fifty percent of those who listened to the tapes expressed a positive attitude towards checking tapes out of the library as compared to checking out a book. However, twenty-eight percent expressed the opinion that they are less interested in reading the printed page as compared to thirty-eight percent who are more interested in reading the printed page. Also, thirty-four percent expressed the opinion that they are as interested in reading as they are in listening. It becomes evident from the results of the experimental group that tape recordings are potentially an accepted technique for disseminating information. Responses of the control group are more positive towards listening to tapes. Twenty-six percent expressed the opinion that they are as interested in listening to tapes as to reading the printed page; whereas forty-three percent expressed a greater

⁶⁰Ibid., p. 6-7.

interest in listening to tapes than reading. Thirty-two percent of the respondents were less interested.⁶¹

Shami investigated the teachers preferred time for tapes and determined that educators preferred the tape recordings which varied in length from fifteen to thirty minutes. None of the respondents liked the forty-five minute tape provided.⁶²

In the elucidation of the conclusion a positive attitude was expressed toward the DOT information system, but reservation was expressed to the practicability of the methods used to disseminate the material (reel-to-reel tapes), Shami states that:

"Educators expressed a positive attitude toward DOT information system as a technique of increasing knowledge, keeping self up-to-date in knowledge, and professional growth. Yet, one shortcoming which was pointed out by a sizeable proportion of the sample (12.10 percent negative attitude and 33.47 neutral) was the practicability of DOT information system. This could be attributed to the fact that the majority of them did not have tape recorders at home, and also the new and more convenient devices of recording and reproduction (such as cassette recorders) have not become very popular among them. The respondents who indicated practicability as a shortcoming of DOT, in fact, might be expressing their opinion against the big and heavy tape recorders currently used in most of the schools, which are difficult to handle and tedious to operate, and are not available in sufficient

⁶¹Ibid., p. 55-58.

⁶²Ibid., p. 65-67.

number. It could be expected that if the newer, lighter-in-weight and easy-to-handle cassette recorders are made available in the libraries of different schools, the practicability of DOT information system would no more be a limitation for its widespread adaptability as a means for the continuous flow of knowledge for the educators."⁶³

James studied the suitability of utilizing audiotape cassette programs as one alternative delivery system for informing school administrators of current concepts and practices in education.

Five audiotape cassette programs were developed relating to different aspects of career education and each of forty participants was asked to answer a number of "open-ended" and "closed" questions and statements on printed questionnaires after listening to the programs.⁶⁴

The primary conclusion reached was that the audiotape cassette approach is a suitable alternate technique for keeping administrators informed of the latest developments in career and occupational education.⁶⁵ Additional conclusions were that:

⁶³Ibid., p. 70.

⁶⁴George B. James, "A Study to Determine the Suitability of Utilizing Audio Cassette Programs As One Alternate Delivery System For Informing School Administrators of Current Concepts and Practices in Education." (Unpublished Ed.D. dissertation, University of Massachusetts, 1973), p. 10.

⁶⁵Ibid., p. 205.

- (1) Some kinds of information, such as statistical data, do not lend themselves for presentation by the audiotape cassette method.
- (2) Based on the data of this study, it appeared that fifteen minutes was considered to be the longest period of time that should be spent listening to any one topic.
- (3) The audiotape cassette programs affected the additional reading by the participants in the study but was not the single major force to stimulate the participants to do additional reading.
- (4) Most of the participants listened to the programs individually for the first time and subsequently with others.⁶⁶

James recommended for future programs that:⁶⁷

- (1) This type of program should not exceed fifteen minutes.
- (2) The technical quality of the recording should be high.
- (3) The audience for whom the programs are to be developed should contribute to the choice of content.

⁶⁶Ibid., p. 206-207.

⁶⁷Ibid., p. 208-210.

- (4) A brief set of notes should accompany each program to support specific points made in the audio cassette program and should include charts, graphs, or statistical information as required.
- (5) A variety of formats for presenting the material should be used.
- (6) Bibliographs should accompany the programs.
- (7) Costs of production should be kept to a minimum.

Judd evaluated the effectiveness of using tape recorded evaluations of compositions written by seventh and eighth grade students to see if there would be a resultant savings in time for the teacher and an increase in the student's interest in his own writing that would lead to more effective writing.⁶⁸

The subjects selected were from a heterogeneous group of seventh and eighth grade English students. The students were randomly placed in the experimental group and control group.⁶⁹ The teachers whose classes were studied were selected on the basis of their interest and willingness to cooperate in the study with no attempt made to choose the teachers at random.⁷⁰ Raters consisted of a

⁶⁸Kirby Edwin Judd, "The Effectiveness of Tape Recorded Evaluations of Compositions Written by Seventh and Eighth Grade Students." (Unpublished Ph.D. dissertation, University of Connecticut, 1973), p. 15.

⁶⁹Ibid., p. 10.

⁷⁰Ibid., p. 72.

panel of six experienced English teachers who evaluated the weekly compositions. One composition per week was written for eight weeks - the first was used in the pre-test and the last as a post-test.⁷¹ A questionnaire was administered to both the control and experimental groups of students and another questionnaire was administered to the teachers.⁷²

The responses to the questionnaire by the students in the experimental group indicated that they found the use of audiotape cassettes more interesting than written comments but did not feel that the tape method would replace written comments except for occasional usage.⁷³ The teachers found that the taping took longer, required a quiet area for recording, and was valuable in grading, especially for less able students.⁷⁴ Another conclusion of the study was that the key factor in the success of the tape recordings is the evaluation technique of the teacher rather than the use of the recorder⁷⁵ and that the sound of the teacher

⁷¹Ibid., p. 74.

⁷²Ibid., p. 77.

⁷³Ibid., p. 111-116.

⁷⁴Ibid., p. 105-107.

⁷⁵Ibid., p. 118.

talking to the student is not a motivational factor in having students write more effectively.⁷⁶

An investigation by Gates to analyze the effectiveness of audiotapes when used by poor readers as a supplement to reading the Intermediate Science Curriculum Study (ISCS) first level materials utilized cassettes. One hundred poor readers selected at random from one representative junior high school were assigned to experimental and control groups. The experimental group consisted of two separate groups of twenty-five students who used audiotape cassettes while the two groups of students who did not use this method comprised the control group. The same teacher taught both classes of poor readers, and both groups followed the same ISCS program. Random selection was used to provide control for extraneous variables other than reading ability.

The data was collected during one academic year. Comparisons were made for the end of year measures in the areas of: (1) subject preference; (2) understanding of science; (3) science vocabulary; (4) total vocabulary; (5) reading comprehension; (6) reading grade level; (7) understanding of ISCS principles; (8) teacher evaluation; and (9) rate of progress using the ISCS material. The following conclusions were reached: (1) students using

⁷⁶Ibid., p. 126.

audiotapes as a supplement to reading in the first level ISCS course have a significantly greater preference for science than those not using the tapes; (2) concepts and course principles were achieved to a significantly greater level by students using the audiotapes; (3) understanding of the content material was comparable in both groups; (4) the vocabulary of the students augmenting their reading with the tapes was greater; and (5) the reading level and comprehension of the group using cassettes was improved over the non-tape group.⁷⁷

Johnson investigated the feasibility of an audiocassette research review subscription service for high school chemistry teachers. The researcher proposed five hypotheses for examination. The first stated that twenty percent or more of the chemistry teachers of the New England Association of Chemistry Teachers (NEACT) would voluntarily choose to subscribe to a chemical education review on audiocassette cassettes if they received two free tapes and the accompanying material. This hypothesis was rejected.⁷⁸

⁷⁷Richard Wade Gates, "An Analysis of Student Outcomes Using Audio Tapes To Supplement Reading In the Level One Course of the Intermediate Science Curriculum Study" (Unpublished Ph.D. dissertation, University of Iowa, 1970), p. 73-74.

⁷⁸Ibid., p. 73-74.

The second hypothesis, which was accepted, indicated that after receiving tape number one, a group of fifty randomly selected subjects from the study population would exhibit significantly more verbalization of information usage on the questionnaire than a control group of the same size.⁷⁹ The third hypothesis stated that the experimental group would indicate using new chemical information more frequently than methodology information. This was also rejected.⁸⁰ The fourth hypothesis postulated that the teachers who indicated use of at least four studies per tape would record at least two minutes of their reactions and criticisms on the returned tapes. This hypothesis was also rejected.

The final hypothesis was that the number of articles reported indicated used would be significantly greater for those teachers indicating: (1) age group of 26-35, (2) degree of B.S. in Chemistry, (3) teaching in school of over one thousand students, (4) teaching with two other chemistry teachers, (5) own their own recorders, (6) reading two journals per month, and (7) relying on periodicals "slightly." All parts of the fifth hypothesis were rejected except item five although there was some statistical difference indicated for items 4 through 7.⁸¹

⁷⁹Ibid., p. 76.

⁸⁰Ibid., p. 80.

⁸¹Ibid., p. 82-95.

The results of the study indicated that the audiotape cassettes presented in this research are not acceptable in their present form. Only four percent of the experimental group subscribed for a third tape even though sixty-seven percent returned favorable comments about the tapes.⁸²

Johnson noted that the acceptability of the format may have been greater if the study had been of a longer duration.⁸³

McElwee compared the use of taped versus written instructor comments as they affect preservice teachers using audiotape cassettes for the taped feedback. The purpose of the study was to determine whether students who received the comments via audiotape cassettes would exhibit greater achievement and a more positive attitude in an elementary reading methods course than students receiving the traditional written comments.⁸⁴

The traditional method, which was also the control method, was defined as the written comments by the instructor

⁸²Ibid., p. 112-116.

⁸³Ibid., p. 118.

⁸⁴Michael R. McElwee, "A Comparison of Assignment and Quiz Evaluations Using Taped Instructor Comments and Written Instructor Comments As They Affect the Achievement and Attitude of Preservice Teachers." (unpublished Ph.D. dissertation, Michigan State University, 1973), p. 85.

on the student's papers and marking incorrect responses to quizzes on the student's answer sheet. The experimental method was the correcting of papers and quizzes by the instructor recording his comments on an audiotape cassette. The population consisted of 187 students systematically assigned to six sections of a teaching of reading methods course.⁸⁵

The conclusions of the study were that:

1. No significant differences were found between students whose assignments were corrected by the audiotape cassette method and by the traditional methods;
2. No significant differences in attitude toward the methods course and reading instruction were found between students whose assignments were corrected by the audiotape cassette method and by the conventional method.⁸⁶

Additional information was gathered as a result of the study. Grading time was substantially longer by using the audiotape cassettes method rather than the traditional

⁸⁵Ibid., p. 100.

⁸⁶Ibid., p. 112-114.

method, averaging almost twice the amount of time. Instructors felt that a more detailed analysis could be made by using audiotape cassettes but were concerned about the increased time required. Most students thought that the use of audiotape cassettes was more beneficial than the written comments.⁸⁷

Moore studied the use of audiotape cassettes as a medium to supplement reading for low achievers in Biology. The study was concerned with the effect of audio-sensory devices on students classified as poor readers in comparison with a control group without the audio aid.⁸⁸ The population used consisted of all the students enrolled in the Basic Science Curriculum Study (BSCS) series Patterns and Processes at the Anamosa Community High School. Two groups used the audiotape cassettes to supplement reading and the one group followed the conventional method of study.⁸⁹ Each group was composed of forty-three students.⁹⁰

⁸⁷Ibid., p. 104-111.

⁸⁸William James Moore, "An Analysis of Student Outcomes in Biology When Audio Tapes Are Used to Supplement Reading for Low Achievers." (unpublished Ph.D. dissertation, University of Iowa, 1973), p. 4.

⁸⁹Ibid., p. 28-29.

⁹⁰Ibid., p. 54.

The conclusions reached were that:

1. Students in the groups using taped and non-taped materials did not differ significantly in attitude toward the subject being taught.
2. Students using taped and non-taped materials did not differ significantly in understanding various science processes.
3. Students in the groups using taped and non-taped materials did not vary significantly in ability to interpret reading material.
4. Students in the groups using taped and non-taped materials did not differ significantly in recall and application of inquiry processes.
5. Students in the tape groups did not differ significantly in performance when compared with a similar group not provided with tapes.⁹¹

This study differs from the previously noted research that indicated the value of supplementary use of audiotape cassettes in the education processes. The limitations of the study which may have effected the outcome are:

(1) the size of the population was small and restricted to a relatively small geographical area, and (2) the students

⁹¹ Ibid., p. 55-56.

involved in the study may have been able to read the material, or read and listen to the material, but were unable to comprehend due to various factors.⁹²

Lerner used the audiotape cassette in his study on determining if the medium was a valid replacement for or adjunct to oral therapy. After ascertaining that other methods had been used when personal visitation was not possible because of time, distance, or money, Lerner proposed using audiotape cassettes to utilize present day technology in the aftercare treatment of juveniles in need of supportive therapy.⁹³

The research by Lerner was based on the premise of Silverman (H. Silverman, "Varieties of Supportive Psychotherapy," Psychology II, 1965, pp. 31-34.) that supportive therapy is crucial to the juvenile's ability to adjust to his family community and peer group. Lerner theorized that audiotape cassettes supply the means for administering the supportive therapy. Cassette therapy, as defined by Lerner, is " . . . a short-termed structured approach which is directed towards problem solving, irrespective of the

⁹² Ibid., p. 57-59.

⁹³ Albert Lerner, "Cassette Therapy; A Method of After-care Treatment." (unpublished Ph.D. dissertation, United States International University, 1972), p. 32.

chronic or non-chronic state or degree."⁹⁴ Additionally, Lerner states that it teaches the juvenile how to develop positive relationships with the change being measured tape by tape in the therapy.

The subjects used by the researcher were selected from the clients at Project Oz and aged from thirteen to eighteen years old. Project Oz is a residential crises intervention center for teenagers with family, school, or community problems in the San Diego, California, area.⁹⁵

The objectives of the study were:

1. To develop a rationale and test a method of after-care therapy using audiotape cassette recordings,
2. to determine the effectiveness of audiotape cassette recordings as a means of bringing about behavior change, and
3. to determine the difference between audiotape cassette aftercare and the lack of audiotape cassette aftercare.⁹⁶

⁹⁴ Ibid., p. 33.

⁹⁵ Ibid., p. 70.

⁹⁶ Ibid., p. 13.

The study employed a two-factor design with repeated measures on one factor (pretesting and posttesting).⁹⁷

A total of thirty-two subjects served during the period of the study,⁹⁸ each of whom was placed on an aftercare schedule of one audiotape cassette recording per week for a period of sixteen weeks.⁹⁹

The results of the study indicated that the greatest effect that cassette therapy had for the experimental group was in personal adjustment scores on the administered tests. Included in the area most greatly effected were the subsets dealing with personal worth, personal freedom, a feeling of belonging, and a reduction in withdrawal tendencies from others.¹⁰⁰

The null hypothesis¹⁰¹ that there was no significant difference from pretesting to posttesting in personal and social adjustment between two groups exposed to audiotape cassettes aftercare and the groups not exposed to audiotape

⁹⁷ Ibid., p. 37.

⁹⁸ Ibid., p. 38.

⁹⁹ Ibid., p. 40.

¹⁰⁰ Ibid., p. 58.

¹⁰¹ Ibid., p. 37.

cassette aftercare, was partially rejected since the aftercare by the audiotape cassette was more effective than no aftercare.¹⁰²

Several uses and limitations of cassette therapy were noted. Examples of other areas where the use of audiotape cassettes for aftercare therapy could be used are:

1. critically ill patients who were leaving a mental facility,
2. inmates leaving a correctional institution who had established a relationship with a counselor at that institution.
3. adults in need of developing some meaning in their lives, and
4. students in overcrowded classrooms who need a better line of communication with their teacher, especially quiet and withdrawn students who need a less threatening method of communicating with their teacher than in the competitive atmosphere of the classroom.¹⁰³

Lerner concludes that cassette therapy ". . . is an attempt to develop a new 'means-whereby' for the treatment and rehabilitation of people who are in need of supportive

¹⁰² Ibid., p. 58.

¹⁰³ Ibid., p. 65.

therapy."¹⁰⁴

Audiotape cassettes used as a format for counseling programs written and narrated by Earl Nightingale were investigated by Wycoff. The study, which contains both descriptive and critical analysis, focuses primarily on the rhetoric of success motivation.

The counseling programs are marketed by the Nightingale-Conant Corporation in ten basic packages. Most of the programs consist of six audiotape cassettes with a thirteen to fourteen minute message on each side of the medium. In addition to the basic programs, the Corporation markets an assortment of individual audiotape cassette messages.¹⁰⁵

A relatively unique marketing plan for distributing rhetoric-type material is employed by the corporation. An international organization of distributors market the cassettes. The distributors are recruited at regional meetings conducted by corporation executives and are established in business with a large inventory and all that is needed to operate autonomously. The distributor then advertises and sells the audiotape cassette programs within his designated area. Consumers purchase the programs from the distributor

¹⁰⁴Ibid., p. 67.

¹⁰⁵Edgar Byron Wycoff, III, "An Analysis of Earl Nightingale's Audio Cassette Counseling Programs: A Case Study in the Rhetoric of Success Motivation." (Unpublished Ph.D. dissertation, Florida State University, 1974), p. 9-11.

or his dealer.¹⁰⁶

The format is studied only as it relates to the investigation of Nightingale's success rhetoric. However, the medium is shown to be a valuable asset for distributing the material.¹⁰⁷

Audiotapes have been studied by various companies and research groups to determine their effectiveness for presenting specified information. A study conducted by an independent research group for INFO, an audio cassette business information journal for physicians, surveyed three hundred recipients of the audio journal. The objectives were to determine: (1) awareness of INFO, and specifically the issue on National Health Insurance; (2) recall of sponsors' advertising; and (3) cassette listening habits of physicians. The results concluded that: (1) ninety-nine percent (99%) of the physicians surveyed were familiar with audio cassette programs and most were aware of the specific service; (2) advertising recall ranged from twenty-nine percent (29%) to thirty-eight percent (38%); and (3) most of the physicians listened to the entire tape, usually at home, and preferred a monthly distribution.¹⁰⁸ Although the commercial nature of the

¹⁰⁶Ibid., 197-199.

¹⁰⁷Ibid.

¹⁰⁸Marketing Research Report on INFO the Audio Journal for Physicians (Commercial brochure), p. 4-11.

investigation does not add credence to an unbiased research methodology, it does emphasize the awareness of the medical profession concerning the use of audiotapes.

Cassette Communications surveyed approximately two hundred salesmen who had received product training by audiotape cassette in order to determine whether the salesmen considered the training to be practical and to determine what to include on future sales training cassettes. A second survey was conducted one year later with the results of the in-house investigations published as a commercial brochure. The conclusions extrapolated from the study were that: (1) Salesmen felt that the program was valuable and should be continued. (2) The preferred length for a tape was ten to twenty minutes. (3) The tapes were listened to primarily at home and secondarily in the car. (4) Most tapes were played two to three times.¹⁰⁹

The research literature on the utilization of spoken-voice audiotape cassettes primarily concerns the function cassettes perform as a device for disseminating information outside the library. Empirical research on the evaluation of acceptance and rejection by library patrons is minuscule and in need of amplification.

¹⁰⁹Cassette Communication, "Sales Training By Tape Cassette; Survey Results," Arlington Heights, Illinois, pp. 1-4. (Mimeographed.)

III. METHODOLOGY AND FINDINGS OF THE RESEARCH

The relative newness of the audiotape in comparison with other library media precludes examination of large collections of the format. The focus of this research was in two parts: (1) an investigation to determine the availability of audiotape cassettes in special libraries and to what extent the patrons are informed about this medium, and (2) an investigation to ascertain how audiotape cassettes are used by special libraries and an evaluation by patrons of this use.

The descriptive method, i.e., the use of a questionnaire to survey the population, was selected for both segments of the research. The first questionnaire (hereafter referred to as the Availability Questionnaire) was sent to a purposive sample of 480 libraries selected from The Directory of Special Libraries and Information Centers (Second Edition).

A purposive sample was considered more appropriate since the use of spoken-voice audiotape cassettes in special libraries is "a mile wide and inches deep." The libraries were selected in the directory which are listed below:

Aerodynamics	Hospital Administration
Aeronautics	Law
Astronautics	Medicine
Astrophysics	Nursing
Business and Business Administration	Pharmacy and Pharmacology
Chemical Engineering	Rockets and Missiles

Chemistry	Science and Technology
Electrical Engineering	Sound Recordings
Electronics	Space Technology
Engineering	Tape Recordings

Of the 480 Availability Questionnaires mailed, 381 were received giving a 79.38% return. Of these, 30 were returned in self-addressed, stamped envelopes without answers. The 30 Availability Questionnaires which were returned unanswered were disregarded in the analysis of the data. The remaining 357 questionnaires were considered valid and were analyzed. The percent of valid returns therefore changes to 73.13%. An assumption could be made that the 30 Availability Questionnaires returned unanswered were from libraries without audiotape cassette collections. However, this assumption is not made due to its tenuous nature.

The second questionnaire (hereafter referred to as the User Questionnaire) was sent to: (1) a large aeronautics research center library, (2) a medical library, and (3) a university library with a special collection of audiotape cassettes. Two hundred seventy four User Questionnaires were returned. Twelve were returned without answers and four were less than 15% complete. These were discarded leaving a total response of 258.

A pretest of the questionnaire was administered to librarians and patrons of a special library to refine both instruments. The research objectives that determined the format,

data analysis techniques, and questions to be asked on the questionnaires were:

- (1) To determine the availability of audiotape cassettes in special libraries and to what extent the patrons are informed about this medium;
- (2) To ascertain how audiotape cassettes are used by special libraries.

More precisely:

- (a) To determine who the users of audiotape cassettes are and if the tapes were listened to by a group or by an individual;
- (b) To determine if there is a relationship between age, background, and vocation of the user and acceptance or rejection of audiotape cassettes;
- (c) To determine where, how often, and when users listen to audiotape cassettes;
- (d) To determine if supplementary printed material is provided with the audiotape cassettes and user reaction to this material when provided;
- (e) To determine if the presentation of the content materials would be better received in another format, and if so, what format.

A. ASSUMPTIONS

1. That the audiotape cassette is a medium utilized by special libraries.

2. That the researcher can gather data which will provide the evaluation necessary for the completion of this study.

B. LIMITATIONS

1. The population to be studied consists of the user of audiotape cassette collections containing material used by selected special libraries.

2. Audiotape cassette collections of music and spoken-voice material intended to replace the printed media for the blind are specifically excluded.

C. DEFINITION OF TERMS

1. Audiotape cassette -- an enclosed reel cartridge measuring from four (4) inches long, two and one-half ($2\frac{1}{2}$) inches wide, and five sixteenths ($\frac{5}{16}$) inch wide capable of recording audiosound for periods up to one hundred twenty minutes.

2. Acceptance of audiotape cassettes -- partial or total use of audiotape cassettes to receive information.

3. Rejection -- complete opposition to receiving information via the audiotape cassette format.

D. FINDINGS OF THE RESEARCH RELATED TO THE AVAILABILITY QUESTIONNAIRE

Table 1 lists the participants by subject category from

The Directory of Special Libraries and Information Centers

(Second Edition) that responded to the Availability Questionnaire. The largest response was from the Science and Technology subject category (43.02%) followed by the categories of Law (15.38%) and Medicine (13.39%). Related combinations of subject categories increase the emphasis of the data areas. The scientific categories, for example, combine for a total of 62.09%.

Aerodynamics	.57
Aeronautics	1.42
Astronautics	1.71
Astrophysics	.57
Chemical Engineering	1.99
Chemistry	5.13
Electrical Engineering	.28
Electronics	1.71
Engineering	2.28
Rockets and Missiles	1.99
Science and Technology	43.06
Space Technology	<u>1.42</u>
TOTAL	62.13

The medical subject area, when combined with the allied topics, totals 19.65%. After consolidation this total places the medical subject category before the ranking given to Law.

Hospital Administration	.57
Medicine	13.39
Nursing	1.42
Pharmacy and Pharmacology	<u>4.27</u>
TOTAL	19.65

The smallest category was Tape Recordings. This grouping has only one response (0.28%) and could have been due to misinterpretation. The classification should have reflected the subject not the format.

TABLE 1
 RESPONDENTS TO THE AVAILABILITY QUESTIONNAIRE
 BY SUBJECT CATEGORY
 (TOTAL NUMBER OF RESPONSES: 351)

SUBJECT CATEGORY	PERCENTAGE
Aerodynamics	.57
Aeronautics	1.42
Astronautics	1.71
Astrophysics	.57
Business and Business Administration	1.99
Chemical Engineering	1.99
Chemistry	5.13
Electrical Engineering	.28
Electronics	1.71
Engineering	2.28
Hospital Administration	.57
Law	15.38
Medicine	13.39
Nursing	1.42
Pharmacy and Pharmacology	4.27
Rockets and Missiles	1.99
Science and Technology	43.06
Sound Recordings	.57
Space Technology	1.42
Tape Recordings	.28

Table 2 presents the results of the response to the Availability Questionnaire concerning whether or not audio-tape cassettes are included in the special libraries audio-tape collection.

TABLE 2
RESPONDENTS WHO HAVE AUDIOTAPE
CASSETTES IN THEIR AUDIOTAPE COLLECTIONS
(TOTAL NUMBER OF RESPONSES: 321)

Response	Percentage
Yes	50.78
No	49.22

The libraries with no audiotape collection or without audiotape cassettes in their collections comprised 50.78% of the sample. Of the remaining 49.22% who did not have audio-tape collections, 33.33% intended to include audiotape cassettes in their collections in the future as shown in Table 3.

TABLE 3
RESPONDENTS WHO INTEND TO INCLUDE
AUDIOTAPE CASSETTES IN THEIR AUDIOTAPE COLLECTIONS
(TOTAL NUMBER OF RESPONSES: 141)

Response	Percentage
Yes	33.33
No	66.67

In the Availability Questionnaire there were forty-two subject categories with an "Other" category for responses which were not considered by the respondent to belong in the listed category. The subject areas provided by the researcher are given in Table 4. The additional forty-four categories supplied by the respondents in the "Other" category are presented in Table 5. Some of the additional categories would appear to overlap the existing classifications but since the respondent felt the difference was sufficient enough to list a separate category, these were reported by the researcher as received and not combined.

The total listing of subject categories with the number of responses is reported as Table 6. The ranked order of the subject areas contained in the audiotape collections comprises Table 7. Medicine with the allied areas of Drug Abuse, Nursing, Surgery, Pharmacy, Speech Therapy, Dentistry, Hospital Administration, Aging, and Anatomy-Physiology was found to be the predominant area in the subject categories. The total responses to these categories comprised 16.61% of the sample. The subject categories are as varied as the literature presented in other formats although the preponderance of the collections cover the medical arts, human relations, and job-related/adult education topics.

TABLE 4

SUBJECT AREAS PROVIDED BY THE RESEARCHER
IN THE AUDIOTAPE CASSETTE COLLECTIONS

SUBJECT AREAS	SUBJECT AREAS
Accounting	Literature
Adult Education	Management
Advertising	Medicine
Astronomy	Nursing
Banking	Personal Development
Business	Radio, Old-Time
Communication	Real Estate
Current Events	Religion
Data Processing	Safety
Drama	Salesmanship
Drug Abuse	Science
Economics	Sex Education
Education	Speech Therapy
Engineering	Sports
Finance	Surgery
Human Behavior	Taxation
Insurance	Typing
Investment	Vocational Counseling
Labor Relations	Woman's Liberation
Languages	Writing
Law	

TABLE 5

SUBJECT AREAS ADDED BY THE RESPONDENTS
AS BEING INCLUDED IN THE AUDIOTAPE
CASSETTE COLLECTIONS ("OTHER" CATEGORY)

SUBJECT AREA	SUBJECT AREA
Ageing	Graphics
Anatomy-Physiology	History
Art	Hospital Administration
Architecture	Human Behavior
ASTM Special Publications	Humanities
Astrology	IEEE Soundings
Biography	Live Cultural Events
Botany	Mathematics
Chemistry	Medical Terminology
Chinese	Medical/Library Education
Comedy	Music
Counseling	Mythology
Current Classes	Nutrition
Dentistry	Obstetrics/Gynecology
Dictation	Pediatrics
Dietetics	Pharmacy
Dog Training	Philosophy
Ecology	Political Science
Electioneering	Real Estate
Environment	Sculpture
Ethics	Secretarial
Finance	Stories for Youth
Folklore	Trim-Nastics
Foreign Affairs	Urban Planning
Geography	Yoga
German	Zoology
Government	

TABLE 6
SUBJECT AREAS INCLUDED IN THE AUDIOTAPE CASSETTE
COLLECTIONS

Subject Areas	Number of Responses	Subject Areas	Number of Responses
Accounting	19	Humanities	1
Adult Education	24	IEEE Soundings	1
Advertising	16	Insurance	12
Ageing	1	Investments	16
Anatomy-Physiology	1	Labor Relations	16
Art	1	Languages	34
Architecture	1	Law	31
ASTM Special Publications	1	Literature	38
Astrology	1	Live Cultural Events	1
Astronomy	13	Management	41
Banking	7	Mathematics	1
Biography	1	Medical Terminology	1
Botony	1	Medicine	50
Business	41	Medical Library	
Chemistry	2	Education	1
Chinese	1	Music	6
Comedy	2	Mythology	3
Communications	39	Nursing	24
Counseling	1	Nutrition	1
Current Classes	2	Obstetrics/Gynecology	1
Current Events	30	Pediatrics	1
Data Processing	14	Personal Development	20
Dentistry	2	Pharmacy	7
Dictation	1	Philosophy	1
Dietetics	1	Political-Science	1
Dog Training	1	Radio, Old Time	20
Drama	32	Real Estate	11
Drug Abuse	38	Religion	20
Ecology	1	Safety	9
Economics	28	Salesmanship	15
Education	28	Science	28
Electioneering	1	Sculpture	1
Engineering	17	Secretarial	1
Environment	2	Surgery	10
Ethics	1	Speech Therapy	3
Finance	18	Sports	5
Folklore	1	Stories for Youth	2
Foreign Affairs	1	Surgery	14
Geography	1	Taxation	10
German	1	Trim-Nastics	1
		Typing	4

TABLE 6 (Continued)

Subject Areas	Number of Responses	Subject Areas	Number of Responses
Government	1	Urban Planning	1
Graphics	1	Vocational Admin.	3
History	3	Woman's Liberation	13
Hospital Administration	2	Writing	9
Human Behavior	46	Yoga	1
		Zoology	1

TABLE 7

RANKED ORDER OF SUBJECT AREAS CONTAINED
IN THE AUDIOTAPE COLLECTIONS

Subject Area	Number of Responses	Subject Area	Number of Responses
Medicine	50	Comedy	2
Human Behavior	46	Current Classes	2
Business	41	Dentistry	2
Management	41	Environment	2
Communications	39	Hospital Administration	2
Drug Abuse	38	Stories for Youth	2
Literature	38	Ageing	1
Languages	34	Anatomy-Physiology	1
Drama	32	Art	1
Law	31	Architecture	1
Current Events	30	ASTM Publications	1
Economics	28	Astrology	1
Education	28	Biography	1
Science	28	Botony	1
Surgery	28	Chinese	1
Adult Education	24	Counseling	1
Nursing	24	Dictation	1
Personal Development	20	Dietetics	1
Radio, Old Time	20	Dog Training	1
Religion	20	Ecology	1
Accounting	19	Electioneering	1
Finance	18	Ethics	1
Engineering	17	Folklore	1
Advertising	16	Foreign Affairs	1
Investments	16	Geography	1
Labor Relations	16	German	1
Salesmanship	15	Government	1
Data Processing	14	Graphics	1
Astronomy	13	Humanities	1
Woman's Liberation	13	IEEE Soundings	1
Insurance	12	Live Cultural Events	1
Real Estate	11	Math	1
Taxation	10	Medical Terminology	1
Safety	9	Med-Lib Education	1
Writing	9	Nutrition	1
Banking	7	Obstetrics/Gynecology	1
Pharmacy	7	Pediatrics	1
Music	6	Philosophy	1
Sports	5	Political-Science	1

TABLE 7 (Continued)

Subject Area	Number of Responses	Subject Area	Number of Responses
Typing	4	Sculpture	1
History	3	Secretarial	1
Mythology	3	Trim-Nastics	1
Speech Therapy	3	Urban Planning	1
Vocational Admin.	3	Yoga	1
Chemistry	2	Zoology	1

Tables 8 and 9 seek to identify the number of separate titles and the number of multiple copies of audiotape cassettes which were contained in the audiotape collections. For collections of less than 50 separate titles, there was little duplication of titles. The data indicates that since the newer, smaller collections are constrained by budget, and concern for acceptance by the patron, purchases were of single copies primarily. Exceptions are multiple requests for material which generates duplication of the item by either purchase or copying. As stated by one respondent:

" . . . We keep the master cassette on file (for those cassettes purchased with permission to copy) and thus we can always make a copy at the request of patron. There is very little damage or maintenance involved. It is a relatively inexpensive item to purchase and very popular with the patrons."

The size of most audiotape collections is less than three hundred audiotape cassettes. Nearly sixty-three percent of the collections number less than three hundred with the majority (39.10%) having less than fifty tapes.

TABLE 8
 NUMBER OF SEPARATE TITLES IN THE
 AUDIOTAPE CASSETTE COLLECTIONS
 (TOTAL NUMBER OF RESPONSES: 162)

Number of Separate Titles	Percentage
Less than 50	45.68
50 to 99	11.11
100 to 199	13.58
200 to 299	11.73
300 to 399	5.56
400 to 499	1.85
Over 500	10.49

TABLE 9
 COLLECTION SIZES OF
 AUDIOTAPE CASSETTES
 (TOTAL NUMBER OF RESPONSES: 162)

Size of Collection	Percentage
Less than 50	39.10
50 to 99	12.18
100 to 199	11.54
200 to 299	9.62
300 to 399	8.97
400 to 499	3.85
Over 500	14.74

Table 10 reflects the intended level of the majority of the titles in the audiotape collection. The responses indicate that most libraries purchase for the Young Adult and Adult collection. This area comprises 86.86% of the total. A portion of the "All Levels" category could also be included to achieve an even higher percentage.

TABLE 10
INTENDED LEVEL OF AUDIOTAPE CASSETTE COLLECTION
(TOTAL NUMBER OF RESPONSES: 175)

Level	Percentage
Elementary	1.14
Young Adult	12.00
Adult	74.86
Elderly	2.29
All Levels	9.71

Major users of the audiotape collections are presented in Table 11. Categories were not provided in the question used to ascertain this answer. However, three examples were provided: (1) doctors, (2) lawyers, and (3) researchers. Students, physicians, and faculty were presented as the heaviest users of audiotape cassettes. The medical profession, represented as physicians and nurses, totalled 21.43% of the sample. The use of audiotape cassettes by academia comprised

44.20% when faculty and students were considered as a group. Researchers would potentially be part of either group, but were reported as delineated by the respondents (7.14%).

TABLE 11
MAJOR USERS OF THE AUDIOTAPE CASSETTE
COLLECTIONS BY RANK
(TOTAL NUMBER OF RESPONSES: 224)

User	Percentage
Students (Including law students, * Medical students, etc.)	31.70
Physicians	13.39
Faculty	12.50
Nurses	8.04
Lawyers	7.59
Researchers	7.14
General Public	5.80
Managers, Administrators	4.46
Engineers	3.13
Scientists	1.79
Businessmen	1.32
Patients	.89
Blind and Physically Handicapped	.45
Housewives	.45
Judges	.45
Pharmacists	.45
Training Personnel	.45

The availability of the audiotape cassettes was segmented into those collections which were available for in-library use only (Table 12) and those collections that circulated the audiotape cassettes (Table 13). Most of the libraries which utilized the audiotape cassettes for in-library use provided playback machines. Of those providing the playback machines, one-half did not circulate the equipment even in those cases where the tapes were circulated.

TABLE 12

AUDIOTAPE CASSETTE COLLECTIONS AVAILABLE
ONLY FOR IN-LIBRARY USE
(TOTAL NUMBER OF RESPONSES: 65)

Availability	Percentage
Carrels with playback machine installed	20.36
Dial access	1.69
Playback machines not circulated from the library	35.59
Playback machines circulated by the library	35.59
Patron's own playback machine	3.39
Audiovisual room	1.69
Class use	1.69

The major portion of those surveyed do circulate the audiotape cassettes (81.15%). Table 13 provides this data.

TABLE 13
COLLECTIONS THAT
CIRCULATE AUDIOTAPE CASSETTES
(TOTAL NUMBER OF RESPONSES: 114)

Response	Percentage
Yes	81.15
No	18.45

Various reasons were given for not circulating the tapes:

"Cassettes are easily lost."

"Small enough to be ripped off easily."

"Easy to steal."

"We duplicate our cassettes and keep the master on file. We do not have to worry about erasure or damage since we are not lending the original cassette."

"All brands do not function properly."

Those libraries that circulate audiotape cassettes also noted problems:

"Damage; theft; not being able to control the type of cassette players used by patron to play our cassettes on."

"Easily stolen, difficult to circulate (too small for bookcard, require separate container, etc.); lack of indexing and lack of commercially available cataloging."

"Hard to circulate (too small to accept regular book-check cards, labels, etc.); lack of standardized box (Norelco breakable, but preferred); lack of standardized labeling and numbering (identification)."

"The size of cassettes makes physical handling difficult--stamping, attaching a card and pockets, etc. The albums are not an answer to us, because each tape has to circulate individually."

"Library Patrons complain about our lack of listening facilities."

"Breakage (cases and tapes), when loaned to patrons who do not use a "good" recorder."

"It breaks. Some find it can be rerecorded or wiped out easily. Abused by patrons. Damage to phonodisc can usually be spotted in an instant -- cassettes need careful inspection -- time's money. Replacement cost is high at high speed duplication."

"Patrons are not accustomed to non-visual. Circulation is difficult to supervise. Facilities conducive to playing the cassettes must be available."

Most problems concerning whether to circulate or not were shared by the majority of the libraries. One problem which may affect more than one medical library was noted only once. Return of the material, even in excellent condition, from a contagious patron (at a hospital) concerned this librarian:

"... When tape cassettes get into an isolation area of the hospital, they are difficult to clean up. What would you do with them? Is exposure to ultraviolet the answer? Gas sterilization is not."

Storage of the audiotape cassettes used in the library or circulated presented problems for many libraries. The chief problem as mentioned earlier was the unauthorized removal of audiotape cassettes from the collection. The size of the tapes facilitate theft. The tapes are easily hidden and hard to mark as library property. Security detection devices which employ magnetism cannot be used since magnetism erases the tape. Airport security searches of cargo which use magnetic devices can erase airmailed tapes and therefore special markings on Interlibrary loan items are required.

Libraries that circulate audiotape cassettes usually

circulate the material for two weeks or less (48.60%).

Audiotape cassettes were also circulated with no specified charge period (17.75%). Slightly over twenty percent (21.50%) of the libraries stated that the tapes were circulated but did not give a specific time period.

TABLE 14
TIME PERIODS FOR
COLLECTIONS THAT CIRCULATE AUDIOTAPE CASSETTES*
(TOTAL NUMBER OF RESPONSES: 114)

Period of Availability	Percentage
Circulated (but period of time not given)	21.50
Less than one week	27.10
Two weeks	21.50
Three weeks	5.61
Four weeks	5.61
Two hours	.93
No specified time	17.75

Percentages of audiotape cassettes which are duplicated for circulation from the individual library's collection are noted in Table 15. Of the total, twenty-six libraries answered this question but noted parenthetically that only non-copyrighted material was duplicated. Of the 114 responses to whether or not the audiotape cassettes were circulated, only fifty stated that the medium was or was not duplicated. Sixty-four failed to select either category indicating possible concern about the problems of copyright or of admitting to possible copyright violations.

TABLE 15
COLLECTIONS WHICH DUPLICATE
TAPES FOR CIRCULATION
(TOTAL NUMBER OF RESPONSES: 50)

Response	Percentage
Yes	54.00
No	46.00

Data concerning the loan and repair of the equipment to utilize the audiotape cassettes and the equipment required for the repair of the audiotape cassettes is presented in Tables 16, 17 and 18.

TABLE 16
SPECIAL LIBRARIES THAT LEND PLAYBACK MACHINES
WITH THE AUDIOTAPE CASSETTE COLLECTIONS
(TOTAL NUMBER OF RESPONSES: 159)

Response	Percentage
Yes	49.06
No	50.94

Only half of the 159 special libraries that responded lend playback machines and less than one-third had the facilities to repair the equipment.

TABLE 17
SPECIAL LIBRARIES WITH THE FACILITIES
FOR THE REPAIR OF PLAYBACK EQUIPMENT
(TOTAL NUMBER OF RESPONSES: 150)

Responses	Percentage
Yes	30.67
No	69.33

Repair facilities for the audiotape cassettes, like the repair of the playback machines, were only found in one-third of the libraries. These were usually the same respondents; that is, if the library had the facilities to repair the playback machines, then facilities existed to repair the tapes.

TABLE 18
SPECIAL LIBRARIES WITH THE FACILITIES
FOR THE REPAIR OF AUDIOTAPE CASSETTES
(TOTAL NUMBER OF RESPONSES: 152)

Response	Percentage
Yes	31.58
No	68.42

Sources for the acquisition of audiotape cassettes to be included in the special libraries collection are reported in Table 19. Publisher's advertisements and professional journals were the primary sources used to acquire audiotape cassettes with requests by patrons as the next higher response.

TABLE 19
 SOURCES USED TO ACQUIRE AUDIOTAPE CASSETTES
 (TOTAL NUMBER OF RESPONSES: 346)

Response	Percentage
Professional journals	31.21
Publisher's advertisement	36.13
Patrons	23.41
Library Staff	2.89
NICEM Index to educational audiotapes	1.73
Audiotape Digest	1.55
Gifts	1.55
Seminars	.96
Produced locally	.57

Fifty percent of the libraries publicize their audiotape cassette collection (Table 20). The primary method of publicity was the library's list of new acquisitions. As shown on Table 21 the use of the news media ranked second. Displays, bulletin boards, posters, signs and brochures were also utilized.

TABLE 20

LIBRARIES WHICH PUBLICIZE
THEIR AUDIOTAPE COLLECTIONS
(TOTAL NUMBER OF RESPONSES: 157)

Response	Percentage
Yes	50.32
No	49.68

TABLE 21

RANKED PERCENTAGES OF METHODS USED TO
PUBLICIZE AUDIOTAPE CASSETTE COLLECTION
(TOTAL NUMBER OF RESPONSES: 157)

Method	Percentage
Library List of Acquisition	42.34
News Media	12.61
Displays and Bulletin Boards	9.01
Brochures	7.22
Oral Recommendation or Personal Contact	5.41
Posters or Signs	5.41
Audiovisual Card Catalog	4.50
Bibliographies	2.70
Memo to Administrators	2.70
Announced at Staff Meetings	1.80
Classroom Presentations	1.80
Journal Subscription Holdings List	1.80
Bookmarks	.90
Carousel Display of Cassette Cases	.90
Library Committee Minutes	.90

Fifty-seven percent of the respondents gave a positive answer to the question, "Do you provide purchase information to the patrons for individual purchase?" (Table 22).

TABLE 22

SPECIAL LIBRARIES PROVIDING
PURCHASE INFORMATION TO THEIR PATRONS
(TOTAL NUMBER OF RESPONDENTS: 157)

Response	Percentage
Yes	57.32
No	42.68

Less than one-third of the special libraries would inter-library loan audiotape cassettes from their collection. The results are shown as Table 23.

TABLE 23

INTERLIBRARY LOAN OF AUDIOTAPE CASSETTES
(TOTAL NUMBER OF RESPONSES: 157)

Response	Percentage
Yes	30.57
No	69.43

Over sixty percent of the special libraries catalog the audiotape cassettes (Table 24) using various systems to catalog the material (Table 25). The predominant method is the Library of Congress Classification System (37.62%). The two systems which rank next are the Dewey Decimal Classification System (19.80%) and the individual library's own in-house classification system (17.82%).

TABLE 24
 AUDIOTAPE CASSETTES WHICH ARE CATALOGED
 (TOTAL NUMBER OF RESPONSES: 150)

Response	Percentage
Yes	62.67
No	37.33

TABLE 25
 SYSTEMS USED TO CATALOG THE
 AUDIOTAPE CASSETTES BY RANK
 (TOTAL NUMBER OF RESPONSES: 150)

System	Percentage
Library of Congress Classification	37.62
Dewey Decimal Classification	19.80
In-House Classification	17.82
National Library of Medicine	8.91
Sequential Numbering	7.92
Alphanumeric System for Classification of Recordings	2.93
Association for Education Communications and Technology	1.00
National Information Center for Educational Media	1.00
Purchase Order Sequence	1.00
Subject Area	1.00
Universal Decimal Classification	1.00

Material accompanying the audiotape cassettes is usually cataloged (Table 26) and the systems used are noted in Table 27.

TABLE 26
 SPECIAL LIBRARIES CATALOGING
 THE ACCOMPANYING MATERIAL
 (TOTAL NUMBER OF RESPONSES: 94)

Response	Percentage
Yes	86.17
No	13.83

TABLE 27
 SYSTEMS UTILIZED TO CATALOG MATERIAL
 ACCOMPANYING AUDIOTAPE CASSETTES
 (TOTAL NUMBER OF RESPONSES: 94)

System	Percentage
Library of Congress Classification	42.65
In-House Classification	20.59
Dewey Decimal Classification	19.12
National Library of Medicine	5.88
Sequential Numbering	4.41
Purchase Order Sequence	2.94
Association for Educational Communications and Technology	1.47
National Information Center For Educational Media	1.47
Universal Decimal Classification	1.47

The majority of the respondents house the material in a separate audiotape cassette file (56.92%) or in a separate audiovisual file (23.08%). Few libraries file the material with the regular collection (10.77%). Table 28 provides this data.

TABLE 28
LOCATIONS UTILIZED FOR STORAGE OF
AUDIOTAPE CASSETTES
(TOTAL NUMBER OF RESPONSES: 130)

Location	Percentage
Separate Audiotape Cassette Files	56.92
Separate Audiovisual File	23.08
With Regular Collection	10.77
Filing Cabinet, Vertical File Drawer	9.23

When material accompanies the format it is filed with the audiotape cassette by two-thirds of the special libraries (Table 29). The remaining groups file the accompanying material separate from the audiotape cassette file. None discarded the material.

TABLE 29

METHOD OF STORAGE OF MATERIAL
ACCOMPANYING AUDIOTAPE CASSETTES
(TOTAL NUMBER OF RESPONSES: 136)

Location	Percentage
With Cassette	65.44
Separate From Cassette	34.56
Discarded	0.00

E. DATA RELATED TO THE USER QUESTIONNAIRE

The respondents to the User Questionnaire were patrons who had used spoken-voice audiotape cassettes from a special library's audiotape collection. The questionnaire is included in Appendix B. Two hundred and fifty-eight respondents returned the questionnaire. Since the distribution of the questionnaire was determined by the willingness of special libraries to have their patrons polled and, in turn, the willingness of the patron to answer the questionnaire, there is no non-response consideration. Therefore, the returns are a convenience sample from: (1) a large aeronautics research center library; (2) 3 medical libraries, and (3) a University library with a special collection of medical audiotape cassettes.

Oppenheim states that it is difficult to ascertain what a person's job actually is. People often give vague job identifications which require further information before they can be classified.¹¹⁰ Since the intent of this questionnaire was to insure response rather than overly specific job identification, the patron was asked to give "Occupation or Job Title." It was expected that some persons would respond in a manner requiring additional clarification. This was the case in 2.7% of the responses to that question. Clarification was

¹¹⁰ A.N. Oppenheim, Questionnaire Design and Attitude Measurement (New York: Basic Books, 1966), p. 59.

accomplished by placing a "manager" of a research enterprise into the "Researcher/Engineer" category. These seven responses were 2.7% of the total number of responses and 5.9% of the Researcher/Engineer Category.

The breakdown of the respondents is shown in Table 30. The category "Researchers/Engineers" included all responses indicating that the person was involved in research or engineering activities. As noted, no attempt was made to segment managers of such activities.

The second category included all patrons utilizing the medical collections. This was labelled "Physician/Medical Personnel." Doctors, Nurses, and Pharmacists comprise this area. It is subdivided into both sexes but care should be taken not to make the assumption that sex determines the occupation. Both female doctors and male nurses are included as well as male doctors and female nurses.

The "Students" category included students at the medical library and students at the research center library. Additionally, students from a university having a specialized collection of spoken-voice audiotapes in the medical field are included.

The fourth category of "Librarians/Information Specialists" was not solicited since the User Questionnaire was intended for patrons of audiotape cassette collections. However,

since the librarians and subject specialists responded, their data is included but with the consideration that responses in this vein are both as user and distributor of such material.

An "Other" category was necessitated by six responses which could not be classified as belonging to any of the above categories. The job titles in this category were: (1) Clerical (3 respondents); (2) Accountant (1 respondent); and (3) Summer Employee (2 respondents).

TABLE 30
RESPONDENTS TO USER QUESTIONNAIRE BY GENDER

(TOTAL NUMBER OF RESPONSES = 258)

Category	Male Percentage of Total	Female Percentage of Total
Researcher/Engineer	39.54	5.81
Physician/Medical Personnel	19.77	2.33
Student	13.95	6.98
Librarian/Information Specialist	0.00	9.30
<u>Other</u>	<u>1.16</u>	<u>1.16</u>
Total	74.42	25.58

Various data was collected to be analyzed about the user of audiotape cassette collections in special libraries. Age of the respondent was requested. The span of ages was from patrons who were less than twenty years old to patrons who were over seventy. Only five respondents were age 60-69. No responses indicated an age of over 70. Only fifteen respondents were under twenty. This is explained by the

inclusion of students since this group has a lower minimum for their age span.

Of the total number of respondents, 117 were in the Researcher/Engineer category; 57 were Physician/Medical Personnel; 54 were classified as Student; 24 were Librarian/Information Specialist; and 6 were placed in the "Other" category. The percentage of each age group is presented in Table 31. The data in Table 32 provides the total of all categories by age group. Although the questionnaire provided for increments of ten for the various age groups, the results are presented in two categories to provide more meaningful statistical evaluation. The age of thirty was selected to segment the categories.

Chi-Square significance for this table was determined by the use of Version Six of the Statistical Package of the Social Sciences (SPSS). The degrees of freedom (df) are also computed by this program. Appendix C presents the data for all the tables (Tables 31 to 55) for which the Chi-Square was determined to be of value. These values are also indicated for each table as appropriate.

TABLE 31
RESPONDENTS TO USER QUESTIONNAIRE BY AGE AND
CATEGORY

(TOTAL NUMBER OF RESPONSES = 258)

Category	Age Group	Percent of Category	Percent of Total
Researcher/Engineer	Less than 30	2.56	1.16
	30+	<u>97.44</u> 100.00	44.19
Physician/Medical Personnel	Less than 30	68.42	15.12
	30+	<u>31.58</u> 100.00	6.98
Student	Less than 30	100.00	20.93
	30+	<u>0.00</u> 100.00	0.00
Librarian/Information Specialist	Less than 30	37.5	3.49
	30+	<u>62.5</u> 100.00	5.81
Other	Less than 30	50.00	1.16
	30+	<u>50.00</u> 100.00	1.16
TOTAL			100.00

Chi-Square = 166.11 with 4 df; Significance = 0.0000

The objectives of the User Questionnaire were:

- (a) To determine who the users of audiotape cassettes are and if the tapes were listened to by a group or by an individual;
- (b) To determine if there is a relationship between age, background, and vocation of the user and acceptance or rejection of audiotape cassettes;

- (c) To determine where, how often, and when users listen to audiotape cassettes;
- (d) To determine if supplementary printed material is provided with the audiotape cassettes and user reaction to this material when provided;
- (e) To determine if the presentation of the content materials would be better received in another format, and if so, what format.

Of the 258 respondents, 231 listened to audiotape cassettes individually while 27 preferred to listen in groups. The responses to the question "How do you listen to audiotape cassettes?" are given in Table 32. The 231 who listened to the audiotape cassettes as individuals comprised nearly ninety percent of the sample. The age span of 20-49 indicated a strong preference for individual listening. Of those preferring the group mode, the predominant age span was 30-49. The younger age span indicated preference for listening as individuals. As previously indicated, the lower age group contained a large percent of students. This possibly meant a need to listen for study which is usually performed in a singular setting as opposed to gathering current awareness information or listening to a conference proceeding which can more easily be accomplished in either the singular setting or in a group setting. The data itself does not support or detract from this indication since the information

was not collected in a manner which could be analyzed to provide conclusions of this nature.

TABLE 32
RESPONDENTS TO USER QUESTIONNAIRE
BY LISTENING PREFERENCE

(TOTAL NUMBER OF RESPONSES = 258)

Age	Individually (% of Total)	In A Group (% of Total)
Less than 20	3.49	1.16
20-29	37.21	0.00
30-39	26.74	3.49
40-49	12.79	3.49
50-59	8.14	0.00
60-69	1.16	2.33
Over 69	0.00	0.00
Total	89.53	10.47
Chi-Square = 52.50 with 5 df; Significance = 0.0000		

Table 33 presents the listener preference by age group and sex. Males in the 20-39 age group indicated that individual listening was preferred (52.33%) as did females in that age group (11.63%). Male respondents preferred to listen to audiotape cassettes individually (68.61% of the total sample and 92.19% of the male respondents). Female respondents preferred to listen as individuals as well

(20.93% of the total sample and 81.82% of the female response)..

TABLE 33
RESPONDENTS TO USER QUESTIONNAIRE BY LISTENING
PREFERENCE AND GENDER

(TOTAL NUMBER OF RESPONSES = 258)

Age	In a Group Male (%)	Individually Male (%)	In a Group Female (%)	Individually Female (%)
Less than 20	0.00	0.00	1.16	3.49
20-29	0.00	29.07	0.00	8.14
30-39	3.49	23.26	0.00	3.49
40-49	1.16	8.14	2.33	4.65
50-59	.00	6.98	0.00	1.16
60-69	1.16	1.16	1.16	0.00
<u>TOTAL</u>	<u>5.81</u>	<u>68.61</u>	<u>4.65</u>	<u>20.93</u>

The Researcher/Engineer category preferred to listen to audiotape cassettes individually as indicated in Table 34. All other categories were similar except for the "Other" category which indicated an equal desire to listen individually or in a group. This category is relatively small (2.36% of the total).

TABLE 34
 RESPONDENTS TO USER QUESTIONNAIRE
 BY LISTENING PREFERENCE AND VOCATION
 (TOTAL NUMBER OF RESPONSES = 258)

Vocation	Individually (% of Total)	In a Group (% of Total)
Researcher/ Engineer	38.37	6.99
Physician/Medical Personnel	20.93	1.16
Student	20.93	0.00
Librarian/Information Specialist	8.14	1.16
Other	1.16	1.16
TOTAL	89.53	10.47
Chi-Square = 21.09 with 4 df; Significance = 0.0003		

To ascertain where patrons listened to audiotape cassettes the question, "Where do you listen to cassettes?", was asked. Five categories were presented: (1) Home; (2) Car; (3) Library; (4) Office; and (5) Other (with a request to please specify). The locations given by the male respondents are presented in Table 35 and the locations by the females are given in Table 36. Neither group utilized the "Other" category.

TABLE 35

RESPONDENTS TO THE USER QUESTIONNAIRE:
LISTENING LOCATION FOR MALES

(TOTAL NUMBER OF MALE RESPONSES = 192)
PERCENTAGES BASED ON TOTAL RESPONSES OF 258

Age	Home (%)	Car (%)	Library (%)	Office (%)
Less than 20	0.00	0.00	0.00	0.00
20-29	13.95	6.98	8.14	0.00
30-39	13.95	3.49	1.16	8.14
40-49	4.65	2.33	0.00	2.33
50-59	4.65	0.00	0.00	2.33
60-69	1.16	0.00	0.00	1.16
<u>Over 69</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
TOTAL	38.36	12.80	9.30	13.96
Chi-Square = 77.81 with 15 df; Significance = 0.0000				

TABLE 36

RESPONDENTS TO THE USER QUESTIONNAIRE:
LISTENING LOCATION FOR FEMALES

(TOTAL NUMBER OF FEMALE RESPONSES = 66)
PERCENTAGES BASED ON TOTAL RESPONSES OF 258

Age	Home (%)	Car (%)	Library (%)	Office (%)
Less than 20	1.16	0.00	2.33	1.16
20-29	3.49	0.00	4.65	0.00
30-39	3.49	0.00	0.00	0.00
40-49	1.16	0.00	2.33	3.49
50-59	0.00	0.00	0.00	1.16
60-69	0.00	0.00	1.16	0.00
Over 69	0.00	0.00	0.00	0.00
TOTAL	9.30	0.00	10.47	5.81
Chi-Square = 77.81 with 15 df; Significance = 0.0000				

The location considered most appropriate by the Researcher/Engineer category in Table 37 indicates a preference for use in the Office. Physicians prefer the Home, then the Library, Car, and Office. Students equate Home and Library with the Car as a minor third place. Librarian/Information Specialists prefer the Library followed by the Home. The "Other" category indicated a preference for Home and Office.

TABLE 37

RESPONDENTS TO THE USER QUESTIONNAIRE:
LISTENING LOCATION BY VOCATION

(TOTAL NUMBER OF RESPONSES = 258)

Vocation	Home (%)	Car (%)	Library (%)	Office (%)
Researcher/ Engineer	20.94	6.98	0.00	17.44
Physician/Medical Personnel	12.79	3.48	4.66	1.16
Student	9.30	2.33	9.30	0.00
Librarian/ Information Specialist	3.49	0.00	5.81	0.00
Other	<u>1.16</u>	<u>0.00</u>	<u>0.00</u>	<u>1.16</u>
TOTAL	47.68	12.79	19.77	19.76

Chi-Square = 115.03 with 12 df; Significance = 0.0000

A summary of the data on the locations patrons use to listen to the audiotape cassettes is shown in Table 38. The majority (47.68%) of the respondents listen to the audiotape cassettes at home. Almost forty percent (39.53%) listen to the medium at the library or in their office. The fourth category by percentage is the automobile which indicates that some patrons listen to the tapes while traveling.

TABLE 38
RESPONDENTS TO USER QUESTIONNAIRE:
LISTENING LOCATIONS
(TOTAL NUMBER OF RESPONSES = 258)

Gender	Home (%)	Car (%)	Library (%)	Office (%)
Male	38.38	12.79	9.30	13.95
Female	<u>9.30</u>	<u>0.00</u>	<u>10.47</u>	<u>5.81</u>
TOTAL	47.68	12.79	19.77	19.76
Chi-Square = 34.17 with 3 df; Significance = 0.0000				

Three periods were given to answer the question, "When do you most often listen to cassettes?" Over half of the respondents (54.65%) indicated that they listened to audio-tape cassettes in the evening. The rest listened in the morning (19.77%) or in the afternoon (25.58%). The data by gender is presented in Table 39.

TABLE 39
RESPONDENTS TO THE USER QUESTIONNAIRE:
PERIOD OF LISTENING BY GENDER
(TOTAL NUMBER OF RESPONSES = 258)

Gender	Morning (%)	Afternoon (%)	Evening (%)
Male	10.47	18.60	45.35
Female	<u>9.30</u>	<u>6.98</u>	<u>9.30</u>
TOTAL	19.77	25.58	54.65
Chi-Square = 17.88 with 2 df; Significance = 0.0001			

Age was a factor influencing when the respondents listened to audiotape cassettes as shown by Table 40. The 20-29 age group preferred the evening as did the 40-49 male age group. However, the 40-49 female group preferred the morning. This group is the only one that indicated a Morning preference over the Evening time period.

TABLE 40
RESPONDENTS TO USER QUESTIONNAIRE:
PERIOD OF LISTENING.
(TOTAL NUMBER OF RESPONSES = 258.)

Age	Male (%) Morning	Male (%) Afternoon	Male (%) Evening	Female (%) Morning	Female (%) Afternoon	Female (%) Evening
Less than 20	0.00	0.00	0.00	0.00	1.16	3.49
20-29	3.49	5.81	19.78	4.65	2.33	1.16
30-39	2.33	9.30	15.12	0.00	1.16	3.49
40-49	2.33	3.49	3.49	4.65	1.16	1.16
50-59	1.16	0.00	5.81	0.00	1.16	0.00
60-69	1.16	0.00	1.16	0.00	0.00	0.00
Over 69	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	10.47	18.60	45.36	9.30	6.97	9.30

The period for listening preferred by the Researcher/Engineer category is the Evening period as reported in Table 41. Physicians and Students expressed a similar preference.

The Library/Information Specialist category, however, indicated a desire to listen to audiotape cassettes in the Morning, followed by Evening. The "Other" category indicated Morning and Afternoon equally with no selections for Evening.

TABLE 41
RESPONDENTS TO USER QUESTIONNAIRE:
PERIOD OF LISTENING BY VOCATION
(TOTAL NUMBER OF RESPONSES = 258)

Vocation	Morning (%)	Afternoon (%)	Evening (%)
Researcher/ Engineer	6.98	15.12	23.25
Physician/Medical Personnel	4.65	2.33	15.12
Student	2.33	5.81	12.79
Librarian/ Information Specialist	4.65	1.16	3.49
Other	<u>1.16</u>	<u>1.16</u>	<u>0.00</u>
TOTAL	19.77	25.58	54.65
Chi-Square = 35.21 with 8 df; Significance = 0.0000			

Both male and female respondents were more likely to have listened to the audiotape cassettes only once as shown in Table 42 although some would have listened to the medium twice. Ten percent of the males indicated that they would listen five or more times. As shown by the Chi-Square value, this statistic is not very reliable.

TABLE 42

RESPONDENTS TO USER QUESTIONNAIRE:
AVERAGE TIMES LISTENED TO BY RESPONDENTS

(TOTAL NUMBER OF RESPONSES = 255)

Gender	Once (%)	Twice (%)	Three (%)	Four (%)	Five or More (%)
Male	32.94	24.70	4.71	1.18	10.59
Female	<u>12.94</u>	<u>8.24</u>	<u>2.35</u>	<u>0.00</u>	<u>2.35</u>
TOTAL	45.88	32.94	7.06	1.18	12.94
Chi-Square = 2.95 with 4 df; Significance = 0.5659					

Tables 43 and 44 provide the breakdown by age and gender in relation to the number of times that the respondents listened to the audiotape cassettes. All age groups predominantly utilize the tapes under three times except those males in the 20-29 age group who indicated that they used the medium five or more times.

TABLE 43

RESPONDENTS TO USER QUESTIONNAIRE:
AVERAGE TIMES LISTENED TO BY MALES

(TOTAL NUMBER OF MALE RESPONSES = 189)
PERCENTAGES BASED ON TOTAL RESPONSES OF 255

Age	Once (%)	Twice (%)	Three (%)	Four (%)	Five or More (%)
Less than 20	0.00	0.00	0.00	0.00	0.00
20-29	12.93	4.71	1.18	0.00	9.41
30-39	10.56	12.93	1.18	1.18	1.18
40-49	4.71	4.71	0.00	0.00	0.00
50-59	3.53	1.18	2.35	0.00	0.00
60-69	1.18	1.18	0.00	0.00	0.00
<u>Over 69</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
TOTAL	32.91	24.71	4.71	1.18	10.59
Chi-Square = 91.85 with 20 df; Significance = 0.0000					

TABLE 44

RESPONDENTS TO USER QUESTIONNAIRE:
AVERAGE TIMES LISTENED TO BY FEMALES

(TOTAL NUMBER OF FEMALE RESPONSES = 66)
PERCENTAGE BASED ON TOTAL RESPONSES OF 255

Age	Once (%)	Twice (%)	Three (%)	Four (%)	Five or More (%)
Less than 20	1.18	3.53	0.00	0.00	0.00
20-29	4.71	0.00	1.18	0.00	2.35
30-39	3.53	0.00	0.00	0.00	0.00
40-49	2.35	3.53	1.18	0.00	0.00
50-59	0.00	1.18	0.00	0.00	0.00
60-69	1.18	0.00	0.00	0.00	0.00
Over 69	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
TOTAL	12.95	8.24	2.36	0.00	2.35
Chi-Square = 91.85 with 20 df; Significance = 0.0008					

The Researcher/Engineer usually listened to the audiotape cassette once or twice as did Physicians. Students tended to either listen once or many times. This would seem to be a result of the need for repetitive listening for the purpose of study. Librarian/Information Specialist and "Other" had similar listening habits to the Researcher/Engineer and Physician/Medical Personnel.

TABLE 45

RESPONDENTS TO USER QUESTIONNAIRE:
AVERAGE TIMES LISTENED TO BY VOCATION

(TOTAL NUMBER OF RESPONSES = 255)

Vocation	Once (%)	Twice (%)	Three (%)	Four (%)	Five or More (%)
Researcher/ Engineer	17.64	20.00	4.71	1.18	1.18
Physician/Medi- cal Personnel	14.11	7.06	1.18	0.00	0.00
Students	4.71	4.71	0.00	0.00	11.75
Librarian/ Information Specialist	8.23	0.00	1.18	0.00	0.00
Other	<u>1.18</u>	<u>1.18</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
TOTALS	45.87	32.95	7.07	1.18	12.93
Chi-Square = 143.12 with 16 df; Significance = 0.0000					

The time limit desired by most respondents is either 20-29 minutes or 30-39 minutes with 60-69 minutes desired by some. The 20-29/30-39 minute consideration could possibly relate to the indefinite delineation between 29 minutes and 30 minutes. The proximity of the two categories indicates that the 20-39 minute time period is most desirable to almost sixty percent of the respondents (61.25%). The data is presented in Table 46. Male respondents preferred the 20-29 minute category (33.75%). The majority of the responses preferred a length from 10 to 39 minutes (58.75%). Similarly 21.25% of the female responses were for the 10 to 39 minute length.

TABLE 46

RESPONDENTS TO USER QUESTIONNAIRE:
 PREFERRED LENGTH OF AUDIOTAPE CASSETTE PRESENTATION (IN MINUTES)
 (TOTAL NUMBER OF RESPONSES = 240)

Time Span (in minutes)	Male (%)	Female (%)	Total (%)
Less than 10	0.00	0.00	0.00
10-19	11.25	7.50	18.75
20-29	33.75	3.75	37.50
30-39	13.75	10.00	23.75
40-49	0.00	3.75	3.75
50-59	6.25	0.00	6.25
60-69	6.25	2.50	8.75
70-79	0.00	0.00	0.00
Over 79	<u>1.25</u>	<u>0.00</u>	<u>1.25</u>
TOTAL	72.50	27.50	100.00
Chi-Square = 54.02 with 6 df; Significance = 0.0000			

Tables 47 and 48 present the listening preference correlated with age and gender. To provide more statistical evaluation, the data was grouped into ages below thirty and thirty or above rather than delineating the data as collected in increments of ten. Additionally, the percentages as presented here and in the tables are based on the total to more accurately show the relationships for males and females as well as the age categories.

Males under age thirty preferred that the audiotape cassettes be 10-39 minutes in length (21.25%) as did those thirty or over (37.50%). Female respondents under thirty preferred the 10-29 minute time period (8.75%) while those age thirty or over preferred the 20-39 minute span (12.50%).

TABLE 47

RESPONDENTS TO USER QUESTIONNAIRE:
PREFERRED LENGTH OF AUDIOTAPE CASSETTE PRESENTATION IN
MINUTES FOR MALES

(TOTAL NUMBER OF MALE RESPONSES = 174)
PERCENTAGES BASED ON TOTAL RESPONSES OF 240

Time (in minutes)	Age Less (%) Than 30	Age 30 (%) or Over	Total (%)
Less than 10	0.00	0.00	0.00
10-19	6.25	5.00	11.25
20-29	10.00	23.75	33.75
30-39	5.00	8.75	13.75
40-49	0.00	0.00	0.00
50-59	2.50	3.75	6.25
60-69	3.75	2.50	6.25
70-79	0.00	0.00	0.00
80+	<u>0.00</u>	<u>1.25</u>	<u>1.25</u>
TOTALS	27.50	45.00	72.50

TABLE 48

RESPONDENTS TO USER QUESTIONNAIRE:
PREFERRED LENGTH OF AUDIOTAPE CASSETTE PRESENTATION IN MINUTES
FOR FEMALES

(TOTAL NUMBER OF FEMALE RESPONSES = 66)
PERCENTAGES BASED ON TOTAL RESPONSE OF 240

Time (minutes)	Age Less Than 30 (%)	Age 30 or Over (%)	Total (%)
Less than 10	0.00	0.00	0.00
10-19	7.50	0.00	7.50
20-29	1.25	2.50	3.75
30-39	0.00	10.00	10.00
40-49	2.50	1.25	3.75
50-59	0.00	0.00	0.00
60-69	2.50	0.00	2.50
70-79	0.00	0.00	0.00
80+	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
TOTALS	13.75	13.75	27.50

The time period from 20 to 39 minutes was most often selected by the Researcher/Engineer category. Physicians selected the 10 to 29 minute period as more appropriate for their needs as did the Librarian/Information Specialist category. Students varied from the 10 to 19 minute period to the 60 to 69 minute time period.

TABLE 49 - PART A

RESPONDENTS TO USER QUESTIONNAIRE:
 PREFERRED LENGTH OF AUDIOTAPE CASSETTE
 PRESENTATION BY VOCATION

(TOTAL NUMBER OF RESPONSES FOR PART A AND PART B = 240)

Time (In Minutes)	Researcher/Engineer (%)	Physicians/Medi- cal Personnel (%)
Less than 10	0.00	0.00
10-19	5.00	7.50
20-29	18.75	12.50
30-39	13.75	1.25
40-49	1.25	0.00
50-59	1.25	1.25
60-69	2.50	1.25
70-79	0.00	0.00
Over 79	<u>1.25</u>	<u>0.00</u>
TOTALS	43.75	23.75

Chi-Square = 105.42 with 24 df; Significance = 0.0000

TABLE 49 - PART B

RESPONDENTS TO USER QUESTIONNAIRE:
 PREFERRED LENGTH OF AUDIOTAPE CASSETTE
 PRESENTATION BY VOCATION

(TOTAL NUMBER OF RESPONSES FOR PART A AND PART B = 240)

Time (In Minutes)	Student (%)	Librarian/ Information Specialist (%)	Other (%)
Less than 10	0.00	0.00	0.00
10-19	2.50	2.50	1.25
20-29	3.75	2.50	0.00
30-39	3.75	5.00	0.00
40-49	2.50	0.00	0.00
50-59	2.50	0.00	1.25
60-69	5.00	0.00	0.00
70-79	0.00	0.00	0.00
Over 79	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
TOTALS	20.00	10.00	2.50
Chi-Square = 105.42 with 24 df; Significance = 0.0000			

To determine if supplementary printed material provided with audiotape cassettes was of value to the user of the medium, the question "When supplementary material is provided with the cassette, do you find it of value?" was asked. Of the 219 responses, 186 (84.95%) replied positively, 33 (15.07%) replied negatively. Excluding the Under 20 age group, the responses indicated that the printed material

was of value as indicated by Table 50 although the data may have been by chance as indicated by the chi-square.

TABLE 50
RESPONDENTS TO USER QUESTIONNAIRE:
VALUE OF SUPPLEMENTARY MATERIAL
BY AGE GROUP

(TOTAL NUMBER OF RESPONSES = 258)

Age	Yes (%)	No (%)
Under 20	1.37	1.37
20-29	34.25	8.21
30-39	28.77	2.74
40-49	12.33	2.74
50-59	4.11	0.00
60-69	<u>4.11</u>	<u>0.00</u>
TOTALS	84.94	15.06
Chi-Square = 12.69, with 5 df; Significance = 0.0265		

Over sixty percent (60.27%) of the males found the supplementary material to be of value as did nearly twenty-five percent of the females. When the males replying in the positive are compared with the males replying in the negative, the percentages are 81.48% and 18.52% respectively. Similarly, the same comparison for females results in 94.74% positive response and 5.26% negative.

TABLE 51

RESPONDENTS TO USER QUESTIONNAIRE:
 VALUE OF SUPPLEMENTARY MATERIAL
 BY GENDER

(TOTAL NUMBER OF RESPONSES = 219)

Sex	Yes (%)	No (%)
Male	60.27	13.69
<u>Female</u>	<u>24.67</u>	<u>1.37</u>
TOTALS	84.94	15.06
Chi-Square = 4.80 with 1 df; Significance = 0.0285		

By vocation more respondents found the supplementary material to be of value except for the "Other" category which answered equally for both responses. As would be expected, Librarians and Information Specialists responded positively toward the value of supplementary material. A rating of "how valuable" might have produced a different response. The highest ratio of value to no value was for the Researcher/Engineer category followed by Physicians, Students and the Librarian/Information Specialist.

TABLE 52

RESPONDENTS TO USER QUESTIONNAIRE:
 VALUE OF SUPPLEMENTARY MATERIAL
 BY VOCATION

(TOTAL NUMBER OF RESPONSES = 219)

Vocation	Yes (%)	No (%)
Researcher/Engineer	36.99	4.11
MD/PhD	17.81	6.84
Student	17.81	2.74
Librarian/Information Specialist	10.96	0.00
Other	<u>1.37</u>	<u>1.37</u>
TOTALS	84.94	15.06
Chi-Square = 18.71 with 4 df; Significance = 0.0009		

To determine if the respondents would have desired the material on the audiotape cassette in another format, the respondents were queried "Would you prefer that the material be presented on another format?". Most replies were negative. Of the 216 replies, 150 males said no as did 54 females. Only 9 males and 3 females indicated yes. This data is presented in Table 53. The only age groups that answered negatively were the 30-39 group and 40-49 group. This data is presented in Table 54. These same 12 negative replies were nine Researchers/Engineers and three Physicians. This data is presented in Table 55. The missing cases affected the chi-square as noted in each category.

TABLE 53

RESPONDENTS TO USER QUESTIONNAIRE:
 FORMAT PREFERENCE BY GENDER
 (TOTAL NUMBER OF RESPONSES = 216)

Sex	Yes (%)	No (%)
Male	4.17	69.44
Female	<u>1.39</u>	<u>25.00</u>
TOTALS	5.56	94.44
Chi-Square = 0.05 with 1 df; Significance = 0.8222		

TABLE 54

RESPONDENTS TO USER QUESTIONNAIRE:
 FORMAT PREFERENCE BY AGE
 (TOTAL NUMBER OF RESPONSES = 216)

Age	Yes (%)	No (%)
Less than 20	0.00	2.78
20-29	0.00	40.27
30-39	2.78	27.78
40-49	2.78	12.50
50-59	0.00	6.94
60-69	0.00	4.17
Over 69	<u>0.00</u>	<u>0.00</u>
TOTALS	5.56	94.44
Chi-Square = 18.48 with 5 df; Significance = 0.0024		

TABLE 55
 RESPONDENTS TO USER QUESTIONNAIRE:
 FORMAT PREFERENCE BY VOCATION
 (TOTAL NUMBER OF RESPONSES = 216)

Vocation	Yes (%)	No (%)
Researcher/Engineer	4.17	38.89
Physicians/Medical	1.39	23.60
Personnel		
Student	0.00	18.06
Librarian/Information		
Specialist	0.00	11.11
Other	<u>0.00</u>	<u>2.78</u>
TOTALS	5.56	94.44

Chi-Square = 7.07 with 4 df; Significance = 0.1322

The educational level of the respondents is presented in Table 56. For analysis of the data both Doctorates of Philosophy (PhD) and Medical Doctorates (MD) are equated. The category "Bachelors" includes both Bachelors of Science (BS) and Bachelors of Arts (BA). Masters of Science (MS) and Masters of Art (MA) are placed in the category "Masters."

TABLE 56
RESPONDENTS TO USER QUESTIONNAIRE:
EDUCATIONAL LEVELS

(TOTAL NUMBER OF RESPONSES = 258)

Gender	HS	BS/BA	MS/MA	MD/PhD
Male	9.30	27.91	13.94	23.26
Female	<u>11.63</u>	<u>9.30</u>	<u>3.48</u>	<u>1.16</u>
TOTAL	20.93	37.21	17.44	24.42

The largest number of respondents had received a Bachelor of Science or Bachelor of Arts (37.21%) while 17.44% had received a Masters of Science or Masters of Art. Doctorates, both Medical Doctorates and Doctorates of Philosophy, comprised 24.42% of the sample. In all categories, the ratio completing each level of education was higher for males than for females except for those completing high school. The inverse was true for this category.

The distribution of the sample for males as shown in Table 57 was 9.30% (HS), 27.91% (BS/BA), 13.94% (MS/MA), and 23.26% (MD/PhD). Table 58 shows that for females the distribution was decreasing for each category: 11.63% (HS), 9.30% (BS/BA), 3.48% (MS/MA), and 1.16% (MD/PhD). Age is a factor in both distributions. The younger categories for both males and females attained a higher level of education.

TABLE 57

RESPONDENTS TO USER QUESTIONNAIRE:
EDUCATIONAL LEVELS OF MALES

(TOTAL NUMBER OF MALE RESPONSES = 192)
PERCENTAGES BASED ON TOTAL RESPONSES = 258

Age	HS	BS/BA	MS/MA	MD/PhD
Less than 20	0.00	0.00	0.00	0.00
20-29	4.65	11.64	0.00	12.80
30-39	1.16	9.30	6.98	9.30
40-49	1.16	1.16	5.80	1.16
50-59	2.33	4.65	1.16	0.00
60-69	0.00	1.16	0.00	0.00
Over 69	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
TOTAL	9.30	27.91	13.94	23.26

TABLE 58

RESPONDENTS TO USER QUESTIONNAIRE:
EDUCATIONAL LEVELS OF FEMALES

(TOTAL NUMBER OF FEMALE RESPONSES = 66)
PERCENTAGES BASED ON TOTAL RESPONSES = 258

Age	HS	BS/BA	MS/MA	MD/PhD
Less than 20	3.49	0.00	0.00	0.00
20-29	6.98	0.00	1.16	1.16
30-39	0.00	2.33	1.16	0.00
40-49	1.16	5.81	0.00	0.00
50-59	0.00	1.16	1.16	0.00
60-69	0.00	0.00	0.00	0.00
Over 69	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
TOTAL	11.63	9.30	3.48	1.16

The respondents to the User Questionnaire were provided two open-ended questions which would elicit positive and negative factors about the use of audiotape cassettes by special library patrons. The first question, "What favorable comments do you have about this medium?", yielded both positive and negative results as did the second query. The negative aspects were such answers as:

"NONE!"

"Absolutely none."

"Good, when nothing else is available."

"Few."

Positive comments related to the ease of use, convenience, format, voice inflections, time savings, and supplementary use for other materials.

"Easy, enjoyable way to obtain information."

"It's excellent."

"An excellent way to disseminate audio information."

A comment often expressed concerned the ability to use audiotape cassettes while doing other tasks. The medium was lauded as a time saver or a means to use time to accomplish more than one function:

"An excellent way to get technical information while doing routine tasks such as driving."

"This is a lot better than reading. It is great when you go on a trip in the car, you can listen and drive."

"Very useful, especially for listening at home, you can do other things while listening to the cassettes."

"Excellent way to spend 1/2 hour transit time between home and work."

"Very effective - I find I can listen, grasp the essence and perform other functions at the same time."

"Can listen while I cook or do house work and can listen as many times as I like."

"Time saving - for general coverage (Not technically detailed)."

"Fastest method of information transfer I have found yet."

Some respondents regarded the medium as useful in education:

"It adds another sense (hearing) to the learning mode."

"Good teaching device. Often topics are not for general knowledge but too specific."

"Enables one to utilize commuting time for continuing education purposes."

Repetition of the information was considered by many as an important feature:

"Cassettes can be replayed. This is important for picking out important points."

"Able to listen as often as necessary for main points for discussion."

"Allows repetition of a lecture if needed."

"It is possible to stop the tape and go over a section again that you didn't catch the first time."

The format was often cited as the most positive aspect of the audiotape cassette. Many respondents felt that the ability to hear the speaker, the tones, and the inflections was most important. The reduced strain on other senses was also noted.

"Get exact words; get to listen at my schedule."

"It communicates more of the spirit of a presentation and an author may present more up-to-date information in a talk. Sometimes a listener can be doing other things while listening."

"Convenience - one can listen when and where one wants to. Relaxing is possible even while listening. Also, the tones and emphasis of the speaker are helpful in understanding the talk one is listening to. Material on one subject can be grouped and studied together to give a good overview of a problem area or topic."

"One can listen and learn while resting one's eyes."

"Saves eye fatigue; may do other things while listening to tape. Several places are suitable for listening to them."

Comments on audiotape cassettes as supplements to other formats were also given:

"It hold one's attention better than reading and if the material isn't too complicated it can fill "wasted" driving time when one has cigarette lighter attachment for car-playing. (However, car pools have eliminated much of my automobile listening. Now do it only on individual trips.)"

"I feel cassette tapes are excellent means of supplementing the books - periodical literature base with current inputs."

The second open-ended question requested unfavorable comments about the medium. The question asked was, "What unfavorable comments do you have about this medium?" Complaints most often voiced concerned the quality of the physical tapes, the quality of the content, lack of supplementary material, and access to playback machines.

The most often noted unfavorable comment concerned the lack of supplementary material:

"Without visual aids it is sometimes very difficult to get the full benefits of the material."

"If lecturer uses vu-graphs, chalk board, the medium can be about useless if no visual supplements are provided (often times but not always). Recording electronics and acoustics, etc., that make up quality of playback are important to listener fatigue. Also foreigners with poor English command or heavy accent cause listener fatigue."

"Sometimes no supplemental visual material is provided when it should be."

"Many cassettes do not provide adequate supplementary material (references, articles, etc.)."

"When detailed technical info is conveyed, I find it difficult to follow tapes without written supportive material."

"More detailed supplementary material ought to be a help."

"Often not enough background to gain a greater appreciation of the material such as seeing examples of these things; perhaps should have slides to accompany the tapes; therefore retention is probably not as great by simply listening and regurgitating the material and not actually putting the material to use."

Problems associated with the format itself were expressed:

"Many are poorly done -- practically none are indexed in the libraries. They themselves have no index for quick reference."

"You can't readily scan-listen like you can scan-read written material. Therefore you can waste a considerable amount of time. I find reading to be better."

"You cannot scan medium, you must listen to the whole damn thing."

"If you are after a special bit of information, you have to listen to an awful lot of stuff in order to find it."

Many criticisms concerned the quality of the equipment and the quality of the audiotape cassettes:

"Fragility of the equipment or malfunctions. Use of cassettes is greater for speeches on more or less general subjects. Not as valuable for intense study in many fields."

"I've had a few annoying experiences with tape bunching up and some inaudibles."

"Cassettes are nearly as delicate as records. As with records, the quality of sound and the life of the recording depend on the playing equipment which is used. I have a fairly expensive cassette player, but it has literally "eaten" five good tapes. No special instructions accompany cassettes and a guarantee beyond factory defects is not plausible."

"The long duration tapes (+ 120 min) have a tendency to bind in the cassette. Recording volume fades which speech is recorded -- subject moves around and gets away from mike. When speech is recorded - extraneous noise recorded (applause, laughter, clicks, bang, etc.) and if you are using an earphone with the volume turned up because of 2 above/well I don't have to say what you think, Right? Especially when the speaker hits the mike with the pointer or coughs into the mike. Lack of visual to get image presented."

Inaccessibility of audiotape cassette players was cited as a problem for some:

"Since I do not have a tape player, I have to obtain one on loan every time I get a cassette. This has taken as long as 2 weeks."

"Tape playback machines are not always available when needed."

"Don't always have access to tape deck."

Negative responses toward audiotape cassettes constituted less than one-third of the forty percent of the sample that responded to the two open-ended questions.

In summary, the respondents had positive comments related to the ease of use, convenience, format, voice inflections, time savings, and use for supplementing other materials. Negative comments cited the lack of supplementary material for use with the medium, the quality of the material presented, and quality of the format and equipment.

Of the forty percent of the sample which responded to the open-ended questions, over two-thirds responded positively toward the medium.

IV. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

SUMMARY

The purpose of this study was to determine the availability and acceptance of audiotape cassettes in the special library. To achieve this purpose, two questionnaires were developed. The first questionnaire, the Availability Questionnaire, was sent to a purposive sample of special libraries in The Directory of Special Libraries and Information Centers (Second Edition). The second questionnaire, the User Questionnaire, was administered to persons who had used audiotape cassettes. Results of the two questionnaires were compiled and analyzed (1) to determine the availability of audiotape cassettes in special libraries and to what extent the patrons are informed about this medium, and (2) to ascertain how audiotape cassettes are used by special libraries. More precisely, the data on how audiotape cassettes are used in special libraries was analyzed: (1) to determine who the users of audiotape cassettes are and whether the tapes were listened to by a group or by an individual; (2) to determine whether there is a relationship between age, background, and vocation of the user and acceptance or rejection of audiotape cassettes; (3) to determine where, how often, and when users listen to audiotape cassettes; (4) to determine whether supplementary printed

material is provided with the audiotape cassettes and user reaction to this material when provided; and (5) to determine whether the presentation of the content materials would be better received in another format, and if so, what format.

A review of the literature revealed that there is widespread use of the audiotape cassette by physicians, lawyers, and the business world. Little empirical evidence existed to evaluate the worth of this medium to these professions or to the information centers, such as special libraries, that disseminate their information via audiotape cassettes.

A. SUMMARY AND CONCLUSIONS RELATED TO THE AVAILABILITY QUESTIONNAIRE

When the results from the Availability Questionnaire were compiled and analyzed, certain findings and conclusions emerged. The study identified how special libraries utilize audiotape cassettes, who the users of this medium are, how the libraries acquire and maintain their collection, and opinions of special librarians as to the value of the audiotape cassette as a medium for disseminating information.

In response to the inquiry to determine whether or not the sampled libraries had audiotape cassettes in their collection, nearly fifty percent replied negatively. Of these, one-third intended to include audiotape cassettes in future acquisitions for their collection. The remaining two-thirds

gave various reasons for not acquiring the audiotape cassettes.

The predominant reason was a lack of need for the information presently available on audiotape cassettes or lack of awareness of any material available on this medium that was of potential use.

The second factor, and one which was usually the primary consideration for smaller libraries, was the cost of the audiotape cassettes. Many libraries stated that the exclusion of the audiotape cassettes was due to budgetary limitations.

No demand from the patrons for audiotape cassettes was often cited as a reason for not purchasing the tapes. Some felt that patrons preferred visual to audio communications and had, therefore, elected not to purchase audiotape cassettes.

Miscellaneous reasons given for not including audiotape cassettes in the audiotape collection were:

- a) easily stolen,
- b) lack of storage space,
- c) format of the material and the necessity of listening in sequence, and
- d) processing workload too heavy to expand to different media.

Many of the libraries were unaware of material available on audiotape cassettes. However, those with the medium in

their collection had material as varied as the printed material which they had acquired. Forty-four additional categories of subjects were added to the forty-two categories supplied by the researcher on the Availability Questionnaire. There is obviously an overlap of subject areas and it should be noted that all categories were reported as delineated by the respondents.

The preponderance of the material was in the three subject areas of: (1) medicine, (2) management, and (3) law. Vocational and self-study audiotape cassettes were next in popularity. Table 5 gave a total breakdown by subject in ranked order.

The number of titles in the collections was relatively small. As can be seen by Table 6, eighty-three-percent of the sampled libraries had collections of less than three hundred separate spoken-voice titles. Only 10.49% had over five hundred titles. This new medium evidently has had a relatively small impact on special libraries to date. However, the responses to whether or not the libraries intend to acquire audiotape cassettes in the future (Table 3) indicate that an increased usage will evolve.

The data presented in Table 7 showed that the smaller collections, that is those of less than three hundred, have fewer duplicate titles whereas the larger collections (those

over five hundred) have substantially more duplicate titles. This would equate to larger library collections acquiring more copies of books and smaller collections having to opt for more individual titles and less duplication.

The heaviest users of spoken-voice audiotape cassettes are students with the emphasis on law students and medical students. Since a large portion of the material available on this medium is in the subject areas of law and medicine, this is to be expected. Faculty rank third in use closely following the physicians. If the categories of physicians and nurses are combined into a group inclusive of the medical profession, then this grouping becomes second in importance. It is evident that physicians, nurses, lawyers, and students of the medical and law profession are the heaviest users.

Special libraries make the medium available to the patrons by various methods. For within library use playback machines are circulated by the library or carrels with playback machines are provided. Dial access capabilities were reported by very few libraries.

A majority of the libraries circulated their audiotape cassettes. Eighty-one percent circulated the tapes and of these, most libraries circulated the tapes for periods of two weeks or less. Twenty percent of the libraries did not specify a time period.

Special libraries duplicate the audiotape cassettes for circulation. The responses to the question "Are your audiotape cassettes duplicated for circulation?" indicated that over fifty percent did copy the tapes. Although the investigator was not trying to ascertain information regarding copyright, many respondents were careful to note that only tapes which granted permission for duplication or tapes without copyright restrictions were copied. Lynn Grabhorn, president of the Listener Corporation, Hollywood, California, expresses the audiotape industry point of view about copying audiotape cassettes. Grabhorn refers to it as a thievery which the companies are ready to go to any lengths to stop.¹¹¹ Therefore, it is not difficult to understand why the respondents were reticent to address this part of the study.

Most special libraries do not maintain the facilities to repair the audiotape cassettes or playback machines.

Audiotape cassettes are likely to have been purchased as a result of advertisements by publishers sent to the library or seen in professional journals. Both librarians and patrons provide purchase sources to acquire the material for the audiotape collection.

When received in the special library, the subject matter on audiotape cassettes is publicized in the library's list of

¹¹¹ Lynn Grabhorn, "Audio Cassettes and the Copyright Question," School Library Journal, XX (November, 1973), p. 6-7.

new acquisitions. This information may be imparted by the internal information dissemination method or in the local news media. Additionally, the conventional methods of making patrons aware of purchases are utilized such as bulletin boards, displays, oral recommendations, audiovisual card catalog, and bibliographies. Most special librarians provide purchase information to patrons who wish to procure their own copies. Another factor which was identified by the study is that interlibrary loan of audiotape cassettes is provided by thirty percent of the special libraries.

Most of the libraries catalog their audiotape cassettes using the Library of Congress Classification System, Dewey Decimal Classification System, or an in-house classification system. Accompanying material is usually cataloged with the audiotape cassette utilizing the same system. The tapes and accompanying materials are stored (with the material) in a separate audiotape cassette file or a separate audiovisual file rather than with the regular collection. No special libraries indicated that accompanying material was ever discarded.

The Availability Questionnaire requested the respondent to indicate favorable and unfavorable comments about the medium. These comments related to how the librarian viewed the use of audiotape cassettes whereas the User Questionnaire requested data from patrons about how they actually used the

medium.

The study identified several factors which the librarians considered either favorable or unfavorable. Compact size for storage, ease of usage under varying circumstances, standardized compatibility of the audiotape cassettes and playback machines, the availability of playback machines for most patrons, and acceptance by patrons were most often cited in the favorable spectrum.

Major criticism about audiotape cassettes centered around the ease with which unauthorized removal from the collection without the intent to return can be accomplished, poor quality of the content and poor technical quality of the medium itself, lack of visual material (such as information on visual slides and on blackboards during student lectures), the absence of bibliographic information with the cassettes, and lack of an index or table of contents. Research librarians noted that no original research is reported via the medium.

B. SUMMARY AND CONCLUSIONS RELATED TO THE USER QUESTIONNAIRE

The respondents to the User Questionnaire were patrons who had used spoken-voice audiotape cassettes from a special library's audiotape collection. After analysis of the data, many conclusions emerged.

Most of the respondents preferred to listen to audiotape cassettes individually while seventeen percent preferred to

listen in groups. Listening preferences were not statistically different for males and females.

The listening locations utilized by the patrons were: (1) home; (2) car; (3) library; and (4) office. Nearly fifty percent of the total respondents listened at home while library usage was approximately twenty-five percent and office usage was twenty percent. The remaining responses of less than ten percent indicated usage of the medium in cars.

The time period for listening to audiotape cassettes most patrons preferred was in the evening. Afternoon listening was the second choice which was closely followed by morning listening. Age and gender were also factors in the choice of the listening time period. Most males preferred the evening. Females in the 40-49 age group preferred the morning although the other groups primarily preferred the evening.

Both male and female respondents were more likely to have listened to the audiotape cassettes only once. The higher age groups listened to the audiotape cassettes fewer times than their lower age counterparts. Over fifty percent of the total listened to the medium only once; one-third listened twice; and just slightly over fifteen percent listened over two times.

The length of time that most respondents listened to audiotape cassettes was from twenty to thirty-nine minutes. The close delineation between the categories in which the thirty

minute time period could be placed may have influenced this. However, when combined the two time periods (20-29 minutes and 30-39 minutes) were desired by almost sixty percent of the respondents. This time period can be accounted for as well by the physical make-up format of the tapes. Three sizes are commercially produced: (1) sixty minute audiotape cassettes which are referred to as C-60; (2) ninety minute audiotape cassettes which are referred to by the manufacturers as C-90; and (3) 120 minute audiotape cassettes designated as C-120. The time period is that determined by playing both sizes; therefore, a C-60 would have 30 minutes of playing time before requiring manual changeover. This size is the more durable and more often used by commercial producers.

When queried in open-ended questions about the favorable and unfavorable aspects of the format additional information was supplied. Positive comments related to the ease of use, convenience, format, voice inflections, time savings, and use for supplementing other materials. The ability to use audiotape cassettes while doing other tasks was also lauded.

Negative aspects of audiotape cassettes most often cited were the lack of supplementary material for use with the audiotape cassettes, quality of the material presented, and quality of the format and equipment.

Of the forty percent of the sample which responded to the open-ended questions, over two-thirds responded positively toward the medium.

C. RECOMMENDATIONS FOR FURTHER RESEARCH

The respondents were aware of the increased usage of audiotape cassettes and most felt that the medium was a valuable format for the dissemination of information. Research is needed to determine how special libraries can best utilize this medium. New uses are emerging and further research is needed:

1. to determine the value of audiotape cassettes to the various segments of the library community, including public, school, and academic libraries;
2. to replicate this research since the use of audiotape cassettes has grown tremendously since the beginning of this study;
3. to learn the relationship of audiotape cassettes to printed material for use as supplementary material or to replace the medium in specific areas;
4. to ascertain user acceptance of compressed speech spoken-voice audiotape cassettes;
5. to determine the advantages and disadvantages to utilizing the medium for disseminating original research;

6. to determine the relationship of the copyright laws to audiotape cassettes and the effects of the actual copying of audiotape; and
7. to determine the advantages and disadvantages of audiotape cassettes as a medium for disseminating information to the general library user.

SELECTED BIBLIOGRAPHY

Books, Journals, and Dissertations

- Atkins, Jim. "Students Learn from Recorded Lectures." Ideas in Sound (April, 1973), 5.
- "The Audio Cassette: A Unique Approach to the 1973 ASIS Annual Meeting." ASIS Newsletter (August, 1973), 3.
- Blay, Andre A., and Pegan, Thomas A. "Cassette Tapes: An Overview." Audiovisual Instruction, XV (September, 1970), 42-44.
- Boss, Richard W., "Audio Materials In Academic Research Libraries." College and Research Libraries, XXXIII (November, 1972), 463-466.
- Brown, E. G. "A Library For Listeners." Canadian Library Journal (May--June, 1972), 241-244.
- Butler, Andrew. "Tips on Tapes." Illinois Libraries, CIV (March, 1972), 224-226.
- Campbell, B. P. "Cassette Solutions." (letter) Library Journal, SCVIII (March 15, 1973), 811-812.
- Carr, Mary. "Cassettes Pertaining to Children's Literature." Wisconsin Library Bulletin, LXIX (November-December, 1973), 397-398.
- Carrol, Donald. "Modern History In Sound: The Story of Audio-Test Cassettes." Source (no. 3, 1973), 6-16.
- Cassette Communications, "Sales Training By Tape Cassette: Survey Results." Arlington Heights, Illinois, (Mimeographed.)
- "Cassettes Appraised as Tool for the Blind and Handicapped." Library Journal, XCVII (March 15, 1972), 964-965.
- "Cassettes at Los Angeles Public Library." Film Library Quarterly, II (Spring, 1969), 49-50.
- "Cassettes Growing as Tool for Salesmen, Sales Training." Merchandising Week, CIII (November 22, 1971), 70.

- "Cassettes on Legal Subjects for Continuing Legal Education." Law Library Journal, LXIII (August, 1970), 315-328.
- "Cassettes on Legal Subjects for Continuing Legal Education." Law Library Journal, LXV (February, 1972), 72-88.
- Doebler, Paul. "Audio Tapes Seek a Place in Bookstores, Libraries." Publisher's Weekly, CCIII (February 19, 1973), 65-68.
- Eaton, Elizabeth S. "Library Orientation Methods: J. Hillis Miller Health Center Library Program." Bulletin of the Medical Library Association, LX (January, 1972), 133-137.
- Gates, Richard Wade. "An Analysis of Student Outcomes Using Audio Tapes to Supplement Reading in the Level One Course of the Intermediate Science Curriculum Study." Unpublished Ph.D. dissertation, University of Iowa, 1970.
- Goyer, Robert S. "Oral Communication: Studies in Listening." Audio-Visual Communication Review, II (1954), 263-276.
- Grabhorn, Lynn. "Audio Cassettes and the Copyright Question." School Library Journal, XX (November, 1973), 6-7.
- Hall, David. "Record Industry Notes." Music Library Association Notes, Journal, (June, 1972), 664-668.
- Hanford, W. E., Maizell, R. E., and Chernoff, M. "Chemical News Via Audio Tapes: Chemical Industry News." Journal of Chemical Documentation, XII (no. 1, 1972), 3-4.
- Hanford, W. E., et al. "The Industrial Chemist and Chemical Information: The Human Ear as a Medium." Journal of Chemical Documentation, XI (no. 2, 1971), 68-69.
- Hawkinson, Bruce. "Theme Grading via Tape Recorder." Educational Screen and Audiovisual Guide., XLIII (December, 1964), 698-699.
- Hernandez, Ramon R. "Youth Choices and Simple Processes; the Young Adult Compact Media Project at Merrill." Wisconsin Library Bulletin, LXVIII (January--February, 1972), 32-36.
- Higgins, Judith. "Coping with Cassettes." Library Journal, SCVIII (April 15, 1972), 1511-1515.

"How Business Uses Cassette Tape Duplicating." Office
(March, 1972), 168-169.

"How Toying About Led to a Discovery." Business Week (October 31, 1970), 68.

"Industry Educational Uses of Cassettes on Upswing." Merchandizing Week, CIII (November 22, 1971), 12.

"Informal Study of Cassette Use." Library of Congress Information Bulletin, XXXVIII (March 20, 1969), 162-3.

James, George Bernard. "A Study to Determine the Suitability of Utilizing Audio Cassette Programs as One Alternative Delivery System for Informing School Administrators of Current Concepts and Practices in Education." Unpublished Ed. D. dissertation, University of Massachusetts, 1973.

Johnson, Edgar N. "The Feasibility of An Audio-Cassette Research Review Subscription Service for High School Chemistry Teachers." Unpublished Ed.D. dissertation, University of Massachusetts, 1974.

Judd, Kirby. "The Effectiveness of Tape Recorded Evaluations of Compositions Written by Seventh and Eighth Grade Students." Unpublished Ph.D. dissertation, University of Connecticut, 1962.

"Leisurely Learning Via Cassettes." The Marketing Magazine, CVI (February 1, 1971), 21.

Lerner, Albert. "Cassette Therapy; A Method of Aftercare Treatment." Unpublished Ph.D. dissertation, United States International University, 1972.

Lohmaier, Gene A. "Training by Cassette." Soldiers, XXX (March, 1975), 26-27.

McElwee, Michael R. "A Comparison of Assignment and Quiz Evaluations Using Taped Instructor Comments and Written Instructor Comments As They Affect the Achievement and Attitude of Preservice Teachers." Unpublished Ph.D. dissertation, Michigan State University, 1973.

McInnis, Noel F. "Cassettes: A Revolution Waiting to Happen." Educational Screen and Audiovisual Guide, XLVIII (March, 1969), 14-19, 42.

- McLaughlin, Frank and Hobbs, Walter. "The System's Approach and Audio Cassettes." Media and Methods, VII (October 1970), 48-50, 168-169.
- "Magnetic Tape: Evolution or Revolution." International Tape Association News Digest (July--August, 1973), 8-9.
- Marketing Research Report on INFO: The Audio Journal for Physicians. (Commercial Brochure), 1-11.
- Moore, William James. "An Analysis of Student Outcomes in Biology When Audio Tapes Are Used to Supplement Reading for Low Achievers." Unpublished Ph.D. dissertation, University of Iowa, 1973.
- Neal, Jack Delano. "Factors Associated With the Use of Audio Cassettes in Keeping School Principals Informed About New Ideas and/or Innovations in Education." Unpublished Ph.D. dissertation, University of Pittsburgh, 1972.
- Noble, Valerie. "Chatty Chatty Band Bang: Business Information Cassettes." Special Libraries, LXIII (May, 1971) 231-233.
- Oppenheim, A. N. Questionnaire Design and Attitude Measurement. New York: Basic Books, 1966.
- Pagotta, Sonny. "How Cassettes Are Used As An Information Source." Ideas in Sound (April, 1973), 3,
- Palmer, Millicent C. "Creating Slide-Tape Library Instruction: the Librarian's Role." Drexel Library Quarterly, VII (July, 1972), 251-267.
- Popham, W. James. "Tape Recorded Lectures In the College Classroom-II." Audio-Visual Communications Review, IX (March--April, 1962), 94-101.
- Port, Jane. "Audiocassette Journals for the Health Professions." Special Libraries, LXIV (November 1973), 490-491.
- Poulos, Arthur. "Audio and Video Cassettes: Friend or Foe of the Librarian." Special Libraries, CXIII (May--June, 1972), 222-226.
- "Record Growth Reported in Cassette Book Program." Library of Congress Information Bulletin, XXXII (November 9, 1973), 385-386.

- Rosenberg, Kenyon C. "Tape Recorders: Open Reel vs. Cassettes." Library Journal, I (October, 1972), 5-11.
- Ryan, Noel. "Will You Have Cassette Tapes In Your Library?" Canadian Library Journal, XXVIII (March 1971), 106-109.
- Shami, Wijdan Ali. "An Innovation In Education: Dissemination on Tape (DOT)." Unpublished Ph.D. dissertation, University of Idaho, 1970.
- Short, Jerry. "Programmed Audio Tapes." Educational Screen and Audiovisual Guide, XLVI (June, 1967), 19, 33.
- Swineford, Edwin J. "Facing Obstacles in the Use of Audiovisuals." Educational Screen and Audiovisual Guide, XXXVII (January, 1959), 19.
- "Taped Audio Programs." Journal of the American Medical Association, CCXXV (August, 13, 1973), 892-894.
- Tauber, Robert Thomas. "The Cassette Tape Recorded Means Versus Written and Symbolic Means of Providing Feedback of a Student's Performance on Secondary School Science Laboratory Exercises." Unpublished Ph.D. dissertation, Pennsylvania State University, 1971.
- "Tips on Cassette Tapes Offered to Libraries." Library Journal, SCVII (December 15, 1971), 4050-4051.
- Vils, Ursula. "Turning On to the Cassette Revolution," Los Angeles Times, (October 13, 1972), 24.
- "What's New." Today's Secretary, LXXVII (November 1974), 2.
- Wiggins, Marvin E. "The Development of Library Use Instructional Programs." College and Research Libraries (November 1972), 473-479.
- Wycoff, Edgar Byron, III. "An Analysis of Earl Nightingale's Audio Cassette Counseling Programs: A Case Study in the Rhetoric of Success Motivation." Unpublished Ph.D. dissertation, Florida State University, 1974.
- Wyman, Raymond. "Toward A Single System for Individual Study." Audiovisual Instruction (February, 1973), 29-30.

OTHER

- Ad-Tapes, Inc. of Palos Verdes Estates, California, no pagination, (catalog).
- American Education Research Association, no pagination, (brochure).
- American Management Association Extension Institute of New York, New York, no pagination, (brochure).
- Booktape Productions of Greenwich, Connecticut, no pagination, (brochure).
- Centennial Tours Company of Orlando, Florida, no pagination, (brochure).
- Everett/Edwards, Inc. of Deland, Florida, no pagination, (catalog).
- Human Behavior Institute, Inc., of Atlanta, Georgia, no pagination, (brochure).
- Institute of Electrical and Electronics Engineers, Inc., no pagination, (brochure).
- John Wiley and Sons, Inc. of New-York, New York, no pagination, (brochure).
- Learning Dynamics, Inc. of Boston, Massachusetts, no pagination, (brochure).
- Mass Communications, Inc. of Westport, Connecticut, no pagination, (brochure).
- Nation's Business Sound Seminar Division of the Chamber of Commerce, no pagination, (brochure).
- Schrello Associates of Long Beach, California, no pagination, (brochure).
- University of California Extension Media Center, XLIV (February 10, 1975), no pagination, (brochure).

APPENDICES

APPENDIX A

AVAILABILITY QUESTIONNAIRE



Dear Colleague:

The purpose of this questionnaire is to determine the patterns of availability of spoken-voice audiotape cassettes used by special libraries. Audiotape cassettes are those enclosed reel cartridges which measure four inches long, two and one-half inches wide, and five sixteenths inch thick (pictured below). Excluded are four track and eight track cartridges and video cartridges. Also excluded are music audiotape cassettes.



Your participation is essential in this research. Neither you nor your institution will be identified in this study. The results will be published as a dissertation from the Florida State University Library School. An abstract of the research will be sent to respondents who check the block at the end of the questionnaire.

I would like to express my sincere appreciation to you for taking the time to complete this questionnaire and for returning it by May 15, 1974.

Sincerely,

J. Marshal Hughes II

J. Marshal Hughes II

John M. Goudeau

Dr. John M. Goudeau
Major Advisor

136

1. Do you have audiotape cassettes in your audiotape collection?

() Yes () No

2. If not, do you intend to include audiotapes in your collection in the future?

() Yes () No

If not, why not? _____

For collections which INCLUDE audiotape cassettes, please complete the following:

3. What subject areas are included in your collection (please mark all categories which are applicable.

() Accounting	() Human Behavior	() Salesmanship
() Adult Education	() Insurance	() Science
() Advertising	() Investment	() Sex Education
() Astronomy	() Labor Relations	() Speech Therapy
() Banking	() Languages	() Sports
() Business	() Law	() Surgery
() Communication	() Literature	() Taxation
() Current Events	() Management	() Typing
() Data Processing	() Medicine	() Vocational Counseling
() Drama	() Nursing	() Woman's Liberation
() Drug Abuse	() Personal Development	() Writing
() Economics	() Radio, Old-Time	() OTHERS:
() Education	() Real Estate	_____
() Engineering	() Religion	_____
() Finance	() Safety	_____

4. How many separate titles are in your collection of audiotape cassettes?

() less than 50	() 200 to 299	() Over 500
() 50 to 99	() 300 to 399	
() 100 to 199	() 400 to 499	

5. What is the total size of your audiotape cassette collection?

() less than 50	() 200 to 299	() Over 500
() 50 to 99	() 300 to 399	
() 100 to 199	() 400 to 499	

137

6. What is the intended level of the majority of your audiotape collection?
- ☐ Elementary ☐ Elderly
- ☐ Young Adult ☐ All levels
- ☐ Adult
7. Who are the major users of your audiotape cassette collection? (For example: doctors, lawyers, researchers, etc.) _____
8. How are the audiotapes made available to your patrons?
- A. In library use only:
- ☐ Carrels with playback machines installed
- ☐ Dial Access
- ☐ Playback machines not circulated from the library
- ☐ Playback machines which are circulated by the library
- ☐ Other _____
- B. Circulated:
- ☐ No
- ☐ Yes - For what period of time?
- ☐ less than one week ☐ four weeks
- ☐ one week ☐ no specified time
- ☐ two weeks ☐ other _____
- ☐ three weeks _____
- Are your audiotape cassettes duplicated for circulation?
- ☐ Yes ☐ No
9. Do you lend tape playback machines with the cassette tapes?
- ☐ Yes ☐ No
10. Do you have facilities for repair of equipment (if you loan)?
- ☐ Yes ☐ No

138

11. Do you have the facilities for repair of the tapes?
☐ Yes ☐ No
12. What sources do you use to acquire audiotape cassettes? (mark all blocks applicable)
☐ professional journals ☐ publisher's advertisement
☐ patrons ☐ other _____
13. Do you publicize your cassette collection as such? ☐ Yes ☐ No
If yes, how? _____

14. Do you provide purchase information to the patrons for individual purchase?
☐ Yes ☐ No
15. Do you use interlibrary loan for the audiotape cassettes in your collection?
☐ Yes ☐ No
16. Do you catalog the tapes themselves?
☐ Yes ☐ No
17. If you do catalog the tapes, which system do you use?
☐ Library of Congress ☐ Dewey Decimal Classification
☐ Other (Please specify) _____
18. If there is accompanying material, do you catalog this information?
☐ Yes ☐ No
If yes, which system do you use?
☐ Library of Congress ☐ Dewey Decimal System
☐ Other (Please specify) _____

19. Where are your cassettes filed?

- ☐ Separate audiovisual file
☐ Separate audiotape cassette file
☐ With regular collection
☐ Other _____

20. If there is accompanying material, how is it filed?

- ☐ With cassette ☐ Other _____
☐ Separate from cassette _____
☐ Discarded _____

21. What favorable comments do you have about this medium? Please be specific
(Use back of page, if needed).

22. What unfavorable comments do you have about this medium? Please be specific
(Use back of page, if needed).

23. Do you wish to receive an abstract of the research when completed?

- ☐ Yes ☐ No

This completes the questionnaire. Thank you for your cooperation.

140

APPENDIX B

USER QUESTIONNAIRE

I NEED YOUR HELP! Libraries are increasingly using the audiotape cassette to provide you, the patron, with various information in this new format. Will you take a few minutes to fill out this questionnaire? Your answers will be treated confidentially and your assistance will be greatly appreciated. Thank you.

1. Sex: ☐ Male ☐ Female
2. Age at last birthday:
 ☐ Under 20 ☐ 30-39 ☐ 50-59 ☐ 70-+
 ☐ 20-29 ☐ 40-49 ☐ 60-69
3. Occupation or Job Title: _____
4. How do you listen to audiotape cassettes? (If both categories, give percentages)
 Individually _____(%) In a group _____(%)
5. Where do you listen to cassettes? (If more than one location, give percentages)
 Home _____(%) Car _____(%) Library _____(%) Office _____(%)
 Other (Please specify) _____
6. When do you most often listen to cassettes?
 ☐ Morning ☐ Afternoon ☐ Evening.
 ☐ Other (Please specify) _____
7. On the average, how many times do you listen to each cassette?
 ☐ One ☐ Two ☐ Three ☐ Four ☐ Five or more
8. What do you feel is the best length for cassettes in terms of listening time?
 ☐ Less than ten minutes ☐ 30-39 minutes ☐ 60-69 minutes
 ☐ 10-19 minutes ☐ 40-49 minutes ☐ 70-79 minutes
 ☐ 20-29 minutes ☐ 50-59 minutes ☐ Over 80 minutes
9. When supplementary material is provided with the cassette, do you find it of value?
 ☐ Yes ☐ No
10. Would you prefer that the material be presented on another format?
 ☐ Yes ☐ No
 If yes, which format? _____
11. Education: (Highest level attained)
 ☐ High School or less ☐ Masters Degree ☐ Other (Please specify) _____
 ☐ Bachelors Degree ☐ Doctorate

(CONTINUED ON OTHER SIDE)

142

12. What favorable comments do you have about this medium? Please be specific - use bottom of page, if needed _____

13. What unfavorable comments do you have about this medium? Please be specific - use bottom of page, if needed _____

Any comments you wish to make in the space below will be appreciated.

Please return this questionnaire to the distribution point in order that it may be forwarded to:

J. Marshal Hughes, II
NASA/LRC Technical Library MS-185
Langley Research Center
Hampton, Va. 23665

143

APPENDIX C

CHI-SQUARE DATA

APPENDIX

<u>Table</u>	<u>Chi-Square</u>	<u>Degree of Freedom</u>	<u>Significance</u>
31	166.11	4	0.0000
32	52.20	5	0.0000
34	21.09	4	0.0000
35	77.81	15	0.0000
36	77.81	15	0.0000
37	115.03	12	0.0000
38	34.17	3	0.0000
39	17.88	2	0.0001
41	35.21	8	0.0000
42	2.95	4	0.5659
43	91.85	20	0.0000
44	91.85	20	0.0000
45	143.12	16	0.0000
46	54.02	6	0.0000
49	105.42	24	0.0000
50	12.69	5	0.0265
51	4.80	1	0.0285
52	18.71	4	0.0009
53	0.05	1	0.8222
54	18.48	5	0.0024
55	7.07	4	0.1322

145

VITA

J. Marshal Hughes II was born in [REDACTED], on [REDACTED]. He received his Bachelor of Science in English from Campbell College in 1967. A Masters of Science was awarded in 1969 by George Peabody College in Library Science and Advanced Masters of Science was received from Florida State University in 1972.

Since 1967 he has been employed by the National Aeronautics and Space Administration Technical Library at Langley Research Center in Hampton, Virginia.

146